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November, 1961

Construction Methods AND EQUIPMENT

A McGRAW-HILL PUBLICATION

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Scrapers Place Fill In Stages to Lick Bad Weather...88

PRICE $1.00

Electronic Paver Controls Hold Grade, Slope, and Crown...84

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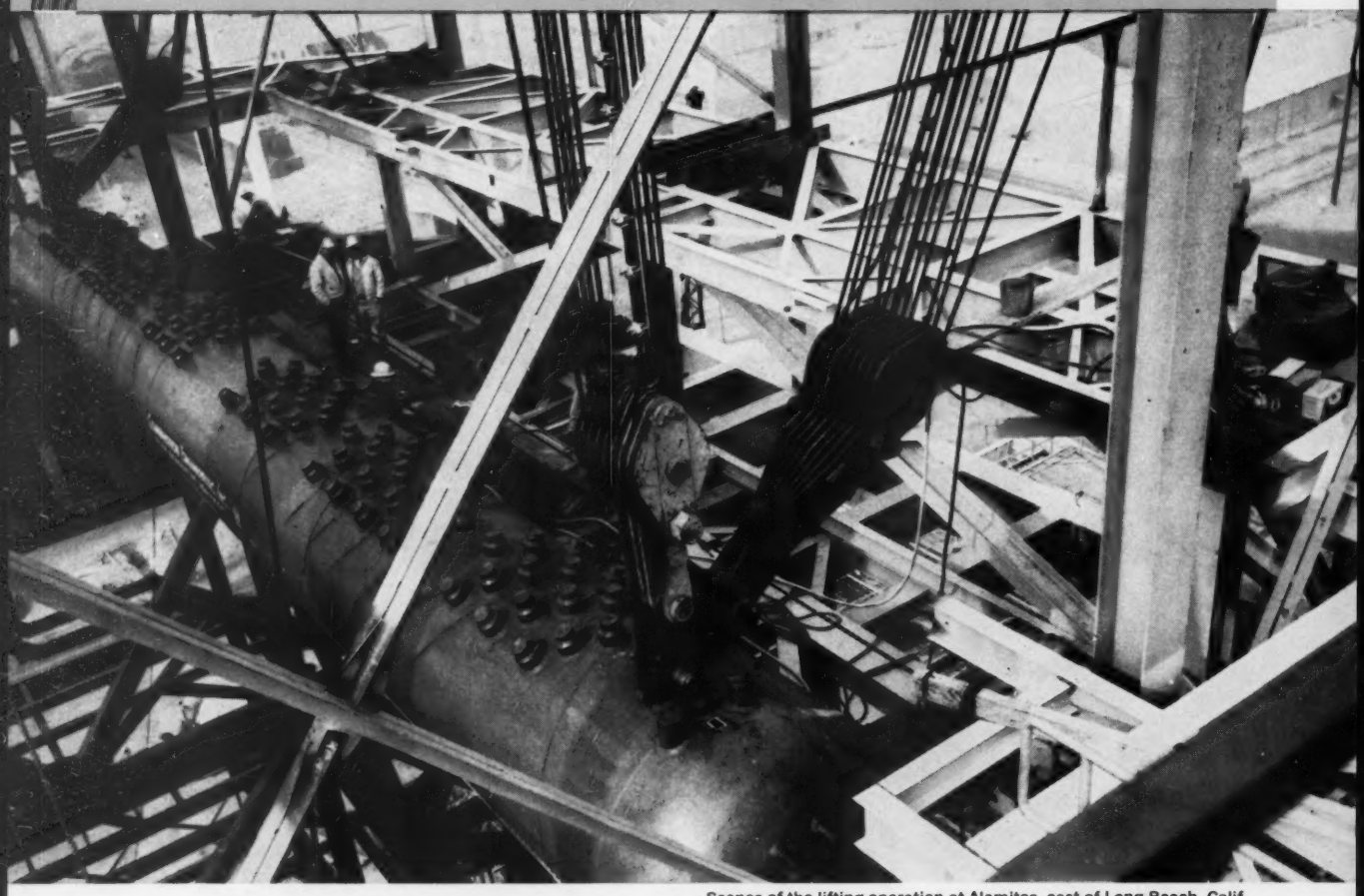
YELLOW STRAND HOLDS DOWN COSTS

lifting a 150-ton Boiler Drum with no margin for error



Scenes of the lifting operation at Alamitos, east of Long Beach, Calif.

Combustion Engineering depends on YELLOW STRAND for 112-foot precision lift at Alamitos Plant

Pulling a 150-ton boiler steam drum up some ten stories with just 1½ inch clearance on either side calls for dependable equipment. Faced with such a task at the Alamitos Steam Station of the Southern California Edison Co., Combustion Engineering Company chose Yellow Strand wire rope and clips. Dependable is the word for Yellow Strand–consistent in strength and durability. Test Yellow Strand yourself. Call your Yellow Strand distributor or representative anytime.

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River of rocks flows over river of water

Aggregate for Ice Harbor Dam project delivered by B.F.Goodrich belt

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Engineers on the Ice Harbor Dam project built a "belt-bridge" to span the 920-foot width of the Snake River. A single conveyor belt moves the rock, sand, gravel across the bridge, then takes it another 270 feet on up to the batching plant.

B.F.Goodrich men, working with the contractor, recommended that the rubber belt be made with BFG Nyfil fabric. Nylon used for cross threads in the fabric adds extra strength to the belt so it can stand wear and tear that causes other belts to break down.

According to the engineers, the B.F.Goodrich belt is doing an excellent job of carrying the 660-ton-per-hour loads of jagged rock. After hauling the 1¼ million tons on this job, it'll probably be moved to another construction site for more years of service.

Your B.F.Goodrich distributor has full information about this Nyfil belt. And, as a factory-trained specialist in rubber products, he can answer your questions about any of the rubber products BFG makes for construction work. *B.F.Goodrich Industrial Products Co., Dept. M-164, Akron 18, Ohio.*

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B.F.Goodrich

CONVEYOR BELTS

Construction Methods AND EQUIPMENT

NOVEMBER, 1961

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VOLUME 43 NUMBER 11

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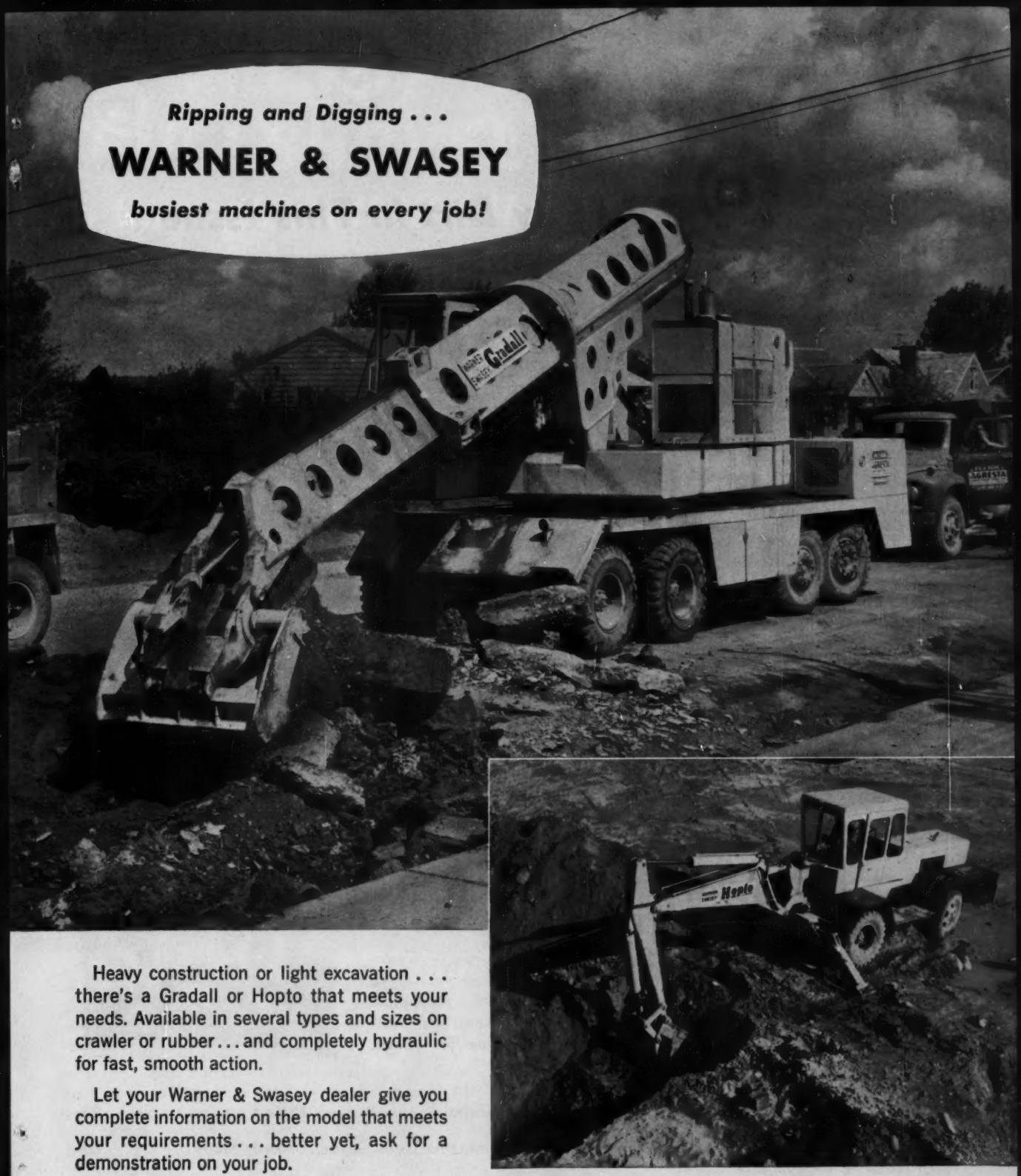

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Construction Methods and Equipment

NOVEMBER, 1961

Pay Dirt in This Issue

ON THE COVER

An electronic screed control system is taking the guesswork out of bituminous paving on a highway job in Iowa. Developed by Minneapolis-Honeywell engineers, the new control system follows a string line set to proper grade and automatically adjusts the pavement thickness, crown, and grade. The operator sets a dial on the control and forgets it. Then all he does is start, stop, and steer the machine. On the Iowa job, production with a Cedarapids paver exceeded 700 tph. *Story, p 84.*

DEPARTMENTS

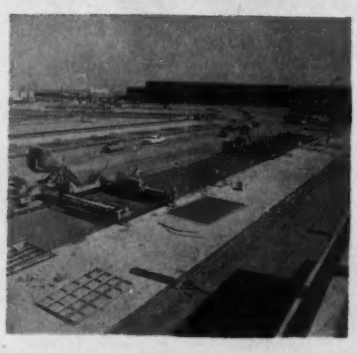
NEXT MONTH

Two contractors working separate sections of a Nebraska interstate highway job must resort to unusual borrow techniques. Roberts Construction Co. of Lincoln must dewater borrow areas along the sand-filled Platte River with wellpoints, then use scrapers to haul fill for 21 mi of road work. Missouri Valley Construction Co. of Grand Island uses a dredge to get fill for an interchange on the same highway. As part of its contract, Missouri Valley must dredge borrow in such a manner that a recreational lake is left behind.

Photo Credits:—63 top, Welton Becket & Associates; 68, top, right, Colorado Dept. of Highways; 68 middle left, Em-Kayan; 82, 83, Providence Journal-Bulletin photos by H. Raymond Ball.

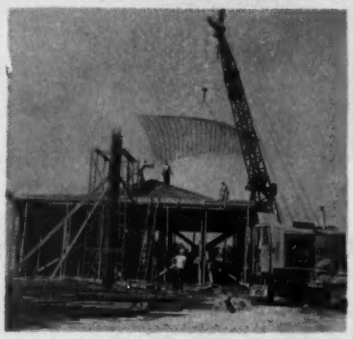
Two-Mile Conveyor Carries Crushed Rock . . . 78

At a steady 2,000-tph pace, this cross-country conveyor moves rock from a crusher at the cut to a man-made lake that is now being filled in to serve as an interchange site.



Twin Paving Trains Speed Big Airport Job . . . 92

To pave a 120-acre parking apron at Chicago's O'Hare Field, twin paving trains must make 900 separate runs. Central-mix concrete is hauled by agitating dump bodies.



Preassembled Steel Braces Unusual Roof . . . 122

Reusable forms that can be repaired easily enable a contractor to mass-produce hyperbolic paraboloid shells. Steel is placed in mats for shells, in bundles for beams.

Circle 5 on Reader Service Card ➤

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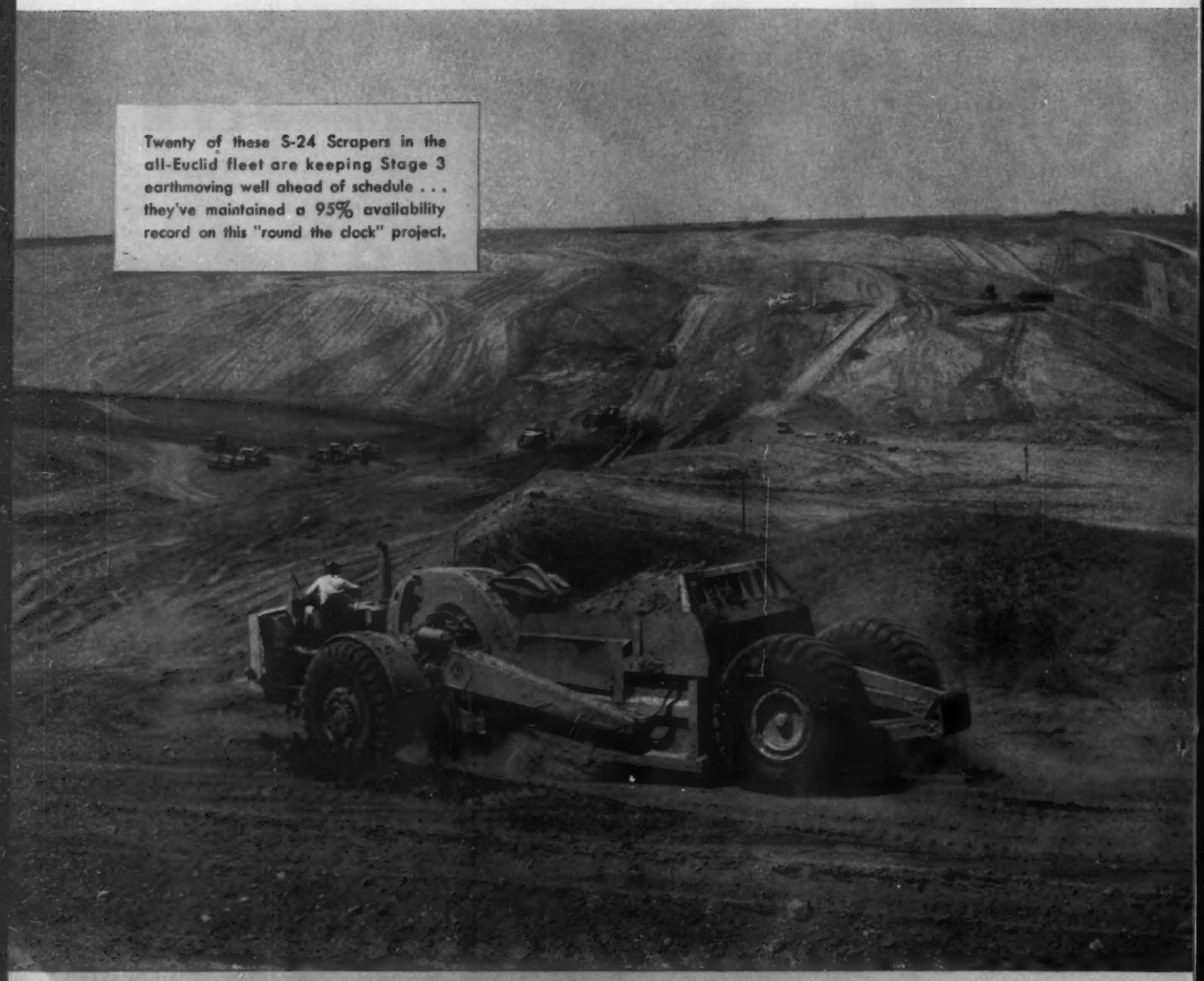

Twenty of these S-24 Scrapers in the all-Euclid fleet are keeping Stage 3 earthmoving well ahead of schedule . . . they've maintained a 95% availability record on this "round the clock" project.

Bedford Const. Co. using 37 Eucs for Stage 3 of South Saskatchewan Dam

"Euc" TC-12 Crawlers and S-24 Scrapers make an ideal team for high production earthmoving on this 26 million yd. contract with a tight completion schedule. Heaped loads of 32 yds. are pushed out in 30 seconds or less . . . best record for a TC-12 to date is over 700 loads in a 10-hour shift.

Largest rolled earth-fill dam ever built in Canada, South Saskatchewan will be 210 ft. high with a main embankment 8,000 ft. long. It will require 52 million yards of excavation and is scheduled for completion late in 1965. Bedford Construction Co. of Toronto. Ont., has the contract for Stage 3 of this big project—26 million yds. to be moved by June, 1963.

On this well organized, high-speed, high production job the all-Euclid fleet works 20 hours a day, six days a week. Bedford Construction purchased 24 Euclid Scrapers of 32 yds. heaped capacity (20 Model S-24 and 4 Model TS-24 "Twins"), 7 Model C-6 and 6 Model TC-12 Crawlers after thorough study of the productive capacity and job availability of competitive equipment . . . on earlier construction at this project and on other jobs.

During a recent month these "Eucs" moved 2 million bank yards on hauls up to 9,000 feet one way . . . with production hitting 50,000 yds. a shift. The big TC-12 crawlers push heaped loads out of the borrow pit in less than 30 seconds. With this kind of production Bedford Construction expects to beat the tight schedule by six months . . . no wonder that Project Manager Vic Grant reports, ". . . we're confident our choice of equipment was the right one"!

Bedford Construction is using 7 C-6 "Euc" tractors for dozing and towing compaction equipment on the fill. All-wheel drive TS-24 Scrapers—four of them—clear out muck holes and maintain haul roads . . . after a near cloud-burst they cleaned up impassable haul roads so that the S-24 fleet was rolling again in only 7 hours.

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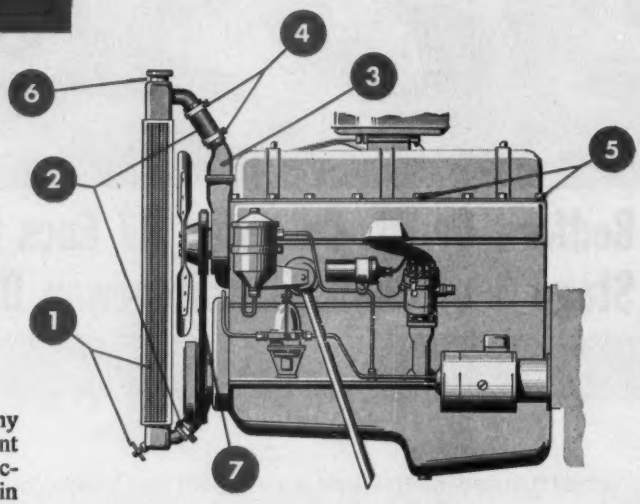
LUBE LOGIC Tips for more

Antifreeze: what's the best type to use; how to make sure you get maximum protection



It's getting pretty close to antifreeze weather in many parts of the country, which brings up two important points: choosing the best type of antifreeze for construction machinery; and making sure the cooling system is in good condition, so the antifreeze can do its job properly.

The right type of antifreeze is the permanent kind. Construction equipment engines operate best at 180°F jacket temperature which is ten degrees higher than the boil-off point for alcohol. Permanent antifreeze (like Texaco Startex) will stay on the job at the temperature that's best for the engine. *Don't* substitute salt or kerosine solutions. They won't freeze, true enough, but they're tough on engine components.

It's important to keep the cooling system in good shape for three reasons: first, because antifreeze that gets into the crankcase causes severe varnish deposits on pistons and rings; second, because you want the antifreeze solution to circulate properly; and third, because antifreeze lost through a leak costs a lot more to replace than just plain water. Before you add antifreeze, check the following points:

1 Clean the cooling system—drain and flush thoroughly.
2 Check the radiator hoses, replace any that are soggy or collapsed.
3 Check the thermostat. If the thermostat is in good condition, the thermostat discharge connection will remain closed until the coolant in the water jacket is up to operating temperature.
4 Tighten connections on hoses that don't need replacing. Antifreeze can pass through spaces too small for water leaks.
5 Tighten cylinder head, oil cooler and other hold-down bolts.
6 Check radiator filler cap gasket.
7 Inspect and adjust fan belt.
8 Now you're ready to put in the antifreeze.

After the antifreeze is in, it's a good idea to:

1 Check the level at operating temperature.
2 Check for leaks.
3 Check water pump packing nut adjustment.
4 Check cooling solution with suitable hydrometer to make sure of protection temperature.

Metal concrete forms can be readied for re-use faster

You can get metal concrete forms cleaned up and back on the job faster if you spray them, before use, with Texaco Stazon. Use the Stazon just as it comes from the container for best results. Field reports say it gives the concrete a fine smooth finish, and the Stazon prevents sticking, shortens clean-up manhours.

Magneto Lubrication: three *IF*s and a *BUT*

IF the magneto is oil-lubricated, apply a few drops of oil every 500 hours.

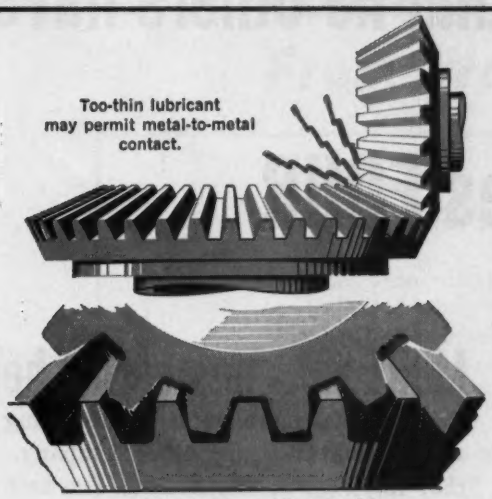
IF the magneto is grease lubricated, apply Texaco Marfak Multi Purpose 2 every 100 hours.

IF the magneto is located near the engine exhaust pipe, lubricate with Texaco High Temp Grease every 50 hours.

BUT if the bearings on your magneto are *sealed*, follow manufacturer's recommendations and let the distributor do the servicing.

Circle 7 on Reader Service Card

efficient equipment performance



Too-thick lubricant will hold dirt,
pack in gear teeth, may damage bearings.

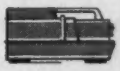
Key points in choosing gear lubricant for gyratory crushers

One of the toughest lube jobs on a gear-driven gyratory crusher is the gears themselves. They're partly protected by oil-tight cases and dust rings, but some contamination is inevitable, and it's essential that you choose a lubricant that can take it.

Viscosity is very important. These gears are very heavily loaded, so too-low viscosity may not provide a film thick enough to prevent metal to metal contact. On the other hand, if the lubricant is too thick, it will hold grit and dust in suspension, and let it develop a scoring action on the gear teeth. In addition, dust tends to dry out lubricants, and also creates a "packing" condition between gear teeth. This packing of dust and dried lubricant can build up undue pressure on gears and bearings.

Your best bet is a lubricant with a viscosity between 50 and 160 seconds Saybolt Universal at 210°F, with extreme pressure characteristics. These specifications will get you a lubricant with a good compromise between too thick and too thin. Ask any Texaco Lubrication Engineer to help you pick the right grade for your temperature zone.

1. PLAN FOR PROFIT—Texaco's newest color-and-sound movie. Dramatizes the major savings you can make with the proper investment of less than 1% of your total budget—the amount you spend on lubricants. Film features latest lubrication methods and equipment on a number of contracting projects, demonstrating the Texaco Simplified Lubrication Plan in action.



2. FUNDAMENTALS OF LUBRICATION—a brand new Texaco color slide film. A clear, concise once-over that defines technical terms like "viscosity" and explains specifically what lubrication is and what it does. This down-to-earth discussion will give the lubrication man a new understanding of the importance of lubrication, and a fresh interest in his work. It's supplemented with a manual that covers the same ground in greater detail.

3. LUBRICATION OF EARTHMOVING EQUIPMENT—a new slide film, in color. A concise, easy-to-understand analysis of proper lubrication of engines, wheel bearings, steering, track rollers, crawler treads, hydraulic equipment, wire rope, open and enclosed gears. Supplemented with a manual that covers the whole field of earthmoving equipment lubrication in greater detail.

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Construction News From Washington

Washington, D.C.
November, 1961

Kennedy Fears More Trouble at Missile Bases

Kennedy Administration officials are worried about a possible new explosion of labor troubles on the nation's missile base construction projects. An emergency meeting of President Kennedy's missile sites labor commission last month heard charges by AFL-CIO craft union officials that non-union contractors are getting an increasing share of the work at Cape Canaveral, Vandenberg Air Force Base, and other missile sites.

Their claim: that unions are tied by a no-strike pledge while more and more missile base work is being performed by non-union workers at below-union rates.

Government officials are seeking a solution to the increasingly hot problem of union versus non-union in hopes of avoiding a new flare-up.

A suggested solution was offered by one commission member: that standard labor rates be applied for all missile work—regardless of a worker's affiliation or non-affiliation with a union.

Unions Continue to Push for "Agency Shops"

Union leaders will press for "agency shop" labor contracts despite a legal cloud that hangs over the issue. While the National Labor Relations Board says it's legal for unions to demand the agency shop—where non-union workers are required to pay service fees to the representative union on their job—the clause is banned in a majority of "right-to-work" states.

The Supreme Court has just refused a union request to review a test case in Kansas where the agency shop is outlawed by a right-to-work law banning union security agreements. As it stands now, the clause may be sought by union negotiators in states without right-to-work laws, but it is those states with the right-to-work laws that labor wants to penetrate with the agency shop contracts.

Federal-Aid Road Program Heads for Big Year

A total of $3,325,000,000 will be available for federal-aid highway construction in the fiscal year starting next July 1. The Commerce Dept. has apportioned to the states $2,400,000,000 for work on the Interstate System of superhighways and $925,000,000 for primary, secondary, and urban highways.

The new apportionment includes an extra $200,000,000 for the Interstate System made available in new highway financing legislation enacted by Congress this summer.

continued on next page

CONSTRUCTION NEWS FROM WASHINGTON . . .

More than 27.4%—10,825 mi—of the 41,000-mi Interstate System now is open to traffic; 4,874 mi are in advanced stages of construction, and engineering or right-of-way acquisition has been completed on 10,052 additional miles. More than $11,200,000,000 has been allotted to the program since it began 5 yr ago.

Government Plans Big Power Line Outlay

Big electric transmission lines (230, 345, 500 KV) linking vast regions of the nation are getting more and more of the spotlight in Washington as the Kennedy Administration begins to define its power policy.

The federal government is both planning and building big new lines for its regional power systems, and it undoubtedly will push for a big say in how power companies and other non-federal systems develop their major interconnections.

The public works appropriation bill for fiscal 1962 includes money for the Bureau of Reclamation to start work on a large grid of high voltage lines throughout the five state area of the Upper Colorado River project—in Wyoming, Colorado, Utah, Arizona, and New Mexico—at an ultimate cost of about $200 million.

Some of these lines may be built by non-federal systems, but they definitely will be built by somebody in the next few years. Other large lines have been rescheduled by the Bureau, including those for the Trinity power project, and others in California and in the Upper Missouri Basin states.

The Interior Dept. has received $300,000 this fiscal year to study other major interconnections, including a long-proposed tie line between Bonneville Power Administration in the Pacific Northwest and major California systems.

The dominant, non-federal (mostly private) sector of the nation's power systems also is pushing rapidly into the area of bigger and costlier lines. A recent report by the Edison Electric Institute estimated that some $8 billion of major transmission lines should be built in the next decade. But the Federal Power Commission, under its aggressive new chairman, Joseph Swidler, probably will demand a major role in helping plan the size and location of many of these lines. An FPC study of the whole subject wouldn't be unlikely within the next year.

An Interior Dept. task force, headed by Bonneville Administrator Charles Luce, is to report to Interior Dept. Secretary Udall this month on the feasibility of a federal Bonneville-California line. This report might be delayed because of the unclear, but potential, significance of a large block of Canadian power that might be marketed over such a line in California.

British Columbia has stalled the Canadian government in ratifying a treaty with the U.S. for development of several large dams on the Columbia River in the U.S. and Canada which would add to the power available for export to California. A rival British Columbia plan, to build a huge Peace River project instead of the treaty dams, must be settled first.

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An important Rieth-Riley project is the construction near Indianapolis of five bridges at the intersection of U.S. 52, Interstate 465 and Bypass 100. Here Miles Shookman checks service and delivery requirements with bridge superintendent H. P. Kunkler.

BY MILES SHOOKMAN

About the Author. Operating out of Indianapolis, Miles Shookman has the job of providing specialized service to construction contractors in his territory. A graduate of Indiana University, Miles is well qualified for this important assignment. He has been doing this work for much of the 15 years he's been with the company, and also attended the Company's Sales Engineering School.

★ ★ ★

Rieth-Riley Construction Company, Inc., is a large, highly diversified contracting firm with headquarters in Goshen, Indiana. As "Contractor Representative" for American Oil Company, I work closely with Rieth-Riley to provide the specialized service needed for construction operations. This means visiting widely scattered projects to make sure the company gets the right product in the right place at the right time—*always*.

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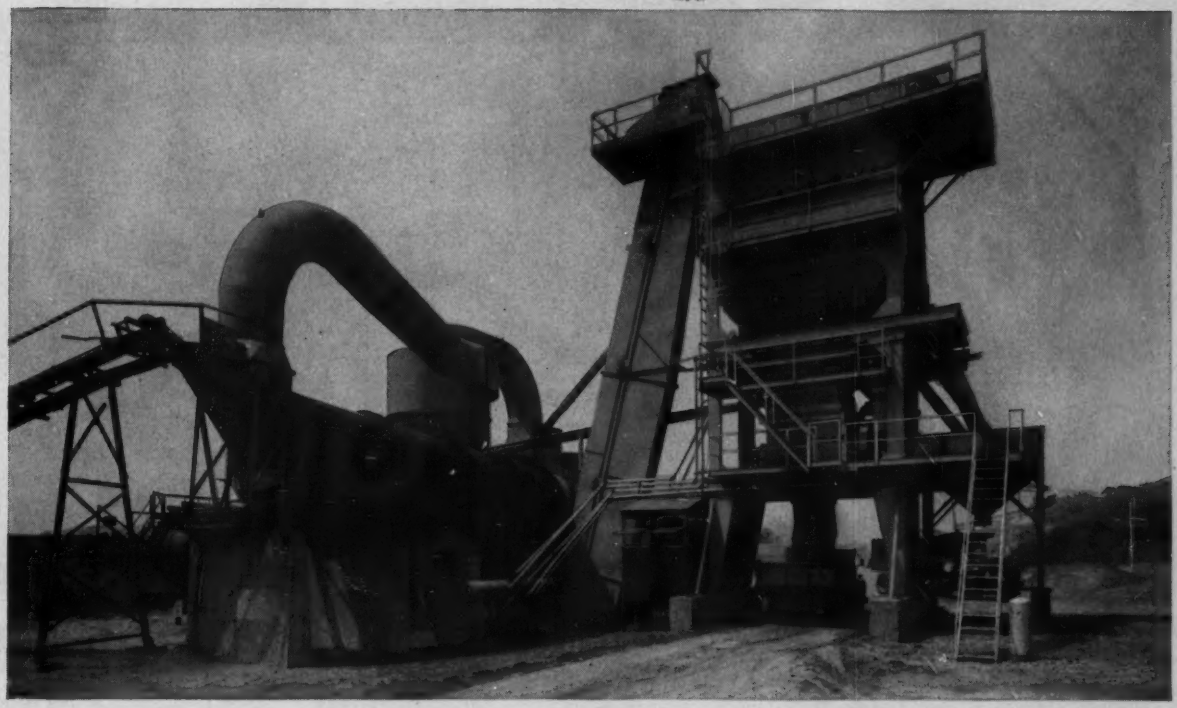
Circle 15 on Reader Service Card

THE USEFULNESS OF A LIMA MADSEN



5 tons of asphalt per batch to serve 3 lay-down machines

Lima Madsen has added the 10,000-lb. batch capacity stationary Model 581 plant to the top of its line of continuous-high-production asphalt plants. Rated output in excess of 300 tons hourly. Other models, portable and stationary, range in batch capacities from 1000 to 10,000 lb.

All Lima Madsens are clean operating—engineered and built for safety, long life and continual year-round operation. Designed for easy maintenance and accessibility—such as the exclusive externally replaceable sectional mixer liners. Fully automated or remote controls are optional. Positive control by weight of every ingredient; rapid, thorough mixing. Patented pressure injection of liquid asphalt cuts mixing time 10 to 15%, reduces mix cycle to 45 or 50 seconds.

Unit design construction of factory-matched sections makes erection easy — whether portable or stationary models. Component equipment is available separately.

For detailed facts and figures, see your Lima Madsen distributor or write us for literature.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA MADSEN Asphalt Paving Plants and Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

6129

Circle 17 on Reader Service Card

Model 2000 wheel excavator speeds 10½ million cu. yd. of excavation at Abiquiu earth-fill dam project in northwestern New Mexico.

DIG OVER 2000 CU. YD. HOURLY WITH THIS NEW WHEEL EXCAVATOR!

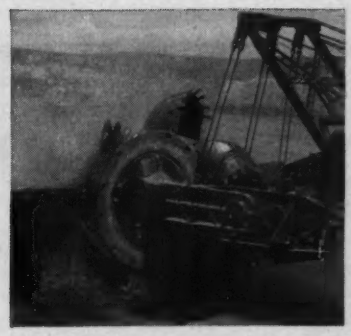
This Model 2000 wheel excavator is designed for low-cost, high-volume stripping or excavating of earth, sand, gravel, shale or sandstone. Maximum theoretical capacity is 3600 cu. yd./hr.; capacity depending on the material.

Completely automatic pushbutton control of digging arc and forward movement; operator can cut in manual controls any time. Six wheel-mounted buckets on digging arm swing back and forth in preset arc up to 180°, then move forward, also at a predetermined rate. Material is carried by conveyor to waiting trucks; twin discharge spouts optional.

Crawler mounted for mobility; factory-matched units can be dismantled and erected in 2 days. Easily transported by truck or trailer.

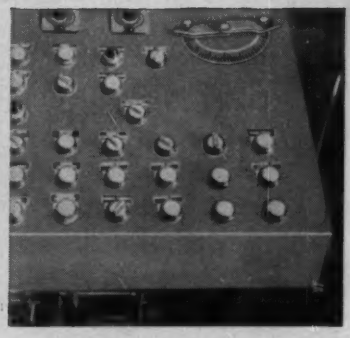
Sound engineering and field testing have developed this rugged, highly dependable wheel excavator for continuous high production. Low maintenance and long life assured by steady power requirements; no peak loads to cause stresses. Write to us here in Lima today for facts, figures and free information.

6128



Six 1-yd. buckets are mounted on a digging wheel which rotates on anti-friction bearings. Cutting teeth are replaceable; available in various finishes and shapes. Normal wheel speed is 10 rpm.

Operator's cab and air-intake stack are located high above dust zone. Operator has full 360° visibility. Blower located in air-intake stack pressurizes machinery cab — eliminates dust. Air exhausts thru engine radiators.



Pushbutton panel gives operator complete manual control of all operations as well as control of selectors to program automatic digging cycle arc swing and depth of cut.

Sold exclusively by

LIMA Construction Equipment Division • Lima, Ohio

BALDWIN · LIMA · HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing Equipment • Asphalt Plants

Designed and built by Mechanical Excavators, Inc., Los Angeles

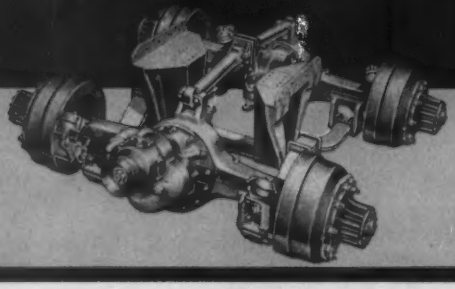
Circle 19 on Reader Service Card

there's a ROCKWELL-STANDARD Driving Tandem for every kind of service

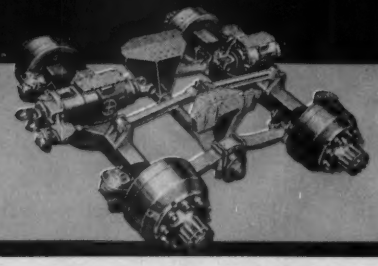
First developed by Rockwell in 1918, driving tandems offer four important advantages over single driving axles... *greater legal payload... greater traction... better flotation... smoother riding!*

Today, only Rockwell-Standard offers a complete line of driving tandem axles to meet every on-or-off highway need. Capacities are available in a range from 22,000 to 150,000 pounds—with axle ratio selection exceeding anything offered elsewhere in the industry.

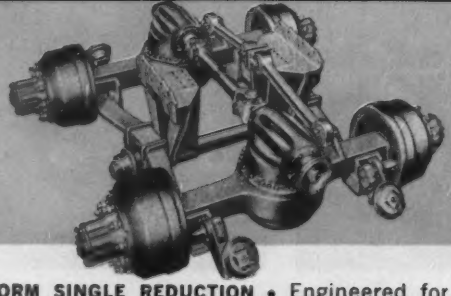
One of the four types of driving tandems below is ideally suited for your particular requirements:



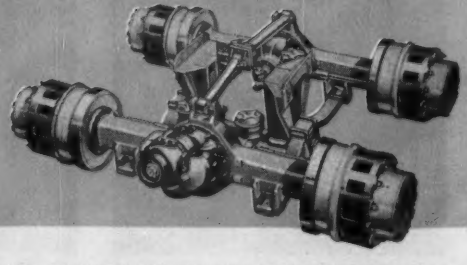
HYPOID SINGLE REDUCTION • Engineered for minimum weight and cost • Husky hypoid gearing for maximum gear strength • Axle ratios up to 8.6 to 1 • Nine models with capacities to 46,000 pounds.



HYPOID-HELICAL DOUBLE REDUCTION • Engineered for universal heavy-duty operations • Balanced hypoid-helical double reduction gearing • Wide selection of ratios • Six models with capacities up to 65,000 pounds.



WORM SINGLE REDUCTION • Engineered for simplicity of design and long life • Worm gear may be reversed to increase operating life • Four models with capacities up to 50,000 pounds.



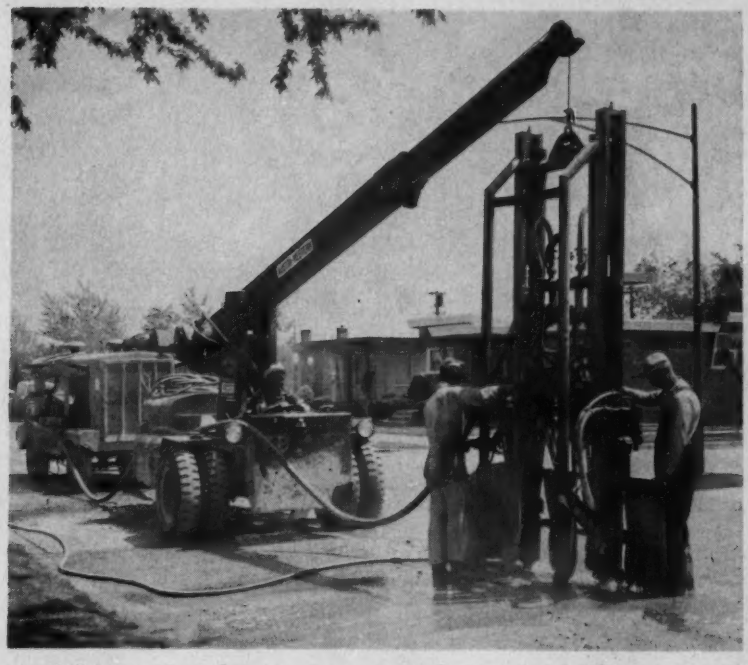
FULL PLANETARY DOUBLE REDUCTION • Engineered for extra heavy-duty operations • Planetary reduction is at wheel end for greatest mechanical advantage • Capacities up to 150,000 pounds.

Products of... **ROCKWELL-STANDARD CORPORATION**

ROCKWELL R STANDARD ©

Transmission and Axle Division, Detroit 32, Michigan

Job Talk...



Rubber-Tired Cranes Hold Rock Drills

Rock drills hung from the booms of rubber-tired hydraulic cranes perforate pavement to make way for a gas main under Chicago streets. The rubber-tired rigs can work far ahead of the backhoe that rips up pavement and do so without disrupting traffic.

Contracting & Material Co. of Evanston, Ill., devised two such rigs for the installation of 12 mi of 36-in. gas main. One rig is a 7-ton-capacity Austin-Western Model 210 hydraulic crane that holds a triple-head Gardner Denver drill suspended from its telescopic boom. The other is a three-wheel A-W Model 110 crane that mounts a twin-head Gardner Denver drill.

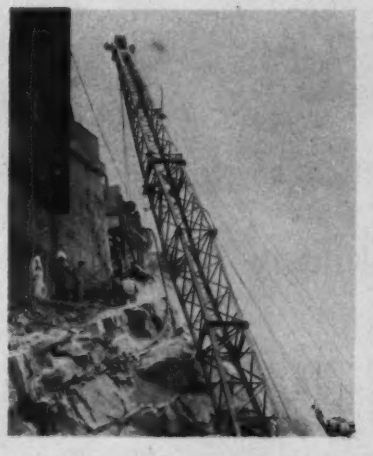
The two crane-mounted drill rigs prepare as much as 600 ft of paving per day for backhoe removal. They bore 2¼-in. holes on 6-in. centers along two or more parallel lines. Drilling time per hole averages just 10 sec. A trailer-mounted 900-cfm Ingersoll-Rand compressor hauled behind each crane supplies air. Nearby hydrants provide water to cool the bits.

Where cross drilling is necessary, the telescoping boom of each crane easily swings back and forth to position the drills. The single-point boom suspension also makes it possible to hand-turn the drills to place holes at an angle to the line of the trench. A backhoe follows the drill rigs to rip up the pavement and dig the trench.

Crane Holds Pipeline Trench Drills Atop Cliff

Because terrain was inaccessible to conventional crawler-mounted drills, a Pennsylvania road-builder suspended a pipeline trench drill from a crane to line drill 500 ft of rocky mountainside.

continued on page 24



THE STUFF THAT WHEELS ARE TURNED BY

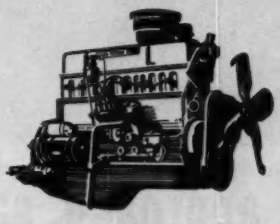
The accent's on torque in a big way for '62, in Chevy's new High Torque power lineup for medium- and heavy-duty trucks. New features, new performance characteristics, and even two brand-new extra-displacement V8's are tailored throughout the line to deliver a heaping hoodful of bulling, bruising torque—to dig in and move out under full capacity loads without a fuss. You'll find Chevy's brand of performance gives you a new kind of mastery over the toughest jobs you tackle, with brute-force breakaway power that just won't take no for an answer. There's no such thing as "no can do" when you're powered up the Chevy High Torque way!

High Torque 261 Six—Standard in Series 60 and 60-H models (GVW's up to 23,000 lbs.). Ideal for hauls that call for load-lugging High Torque power *plus* proved 6-cylinder economy. Delivers 235 ft.-lbs. of torque and 150 hp to handle maximum loads with low-cost efficiency. This engine backs up your bank account with brute strength to spare—with a forged steel crankshaft, high-alloy inlet valves, hard-faced exhaust valves with Rotocoils and much more.

High Torque 327 V8—Optional at extra cost in Series 60 and 60-H (GVW's up to 23,000 lbs.). It's Chevy's newest and biggest medium-duty engine, ready to turn to with 305 ft.-lbs. of hard-pulling torque and 185 hp to tame your toughest jobs. Efficiency stays up, operating costs stay *low* with top-quality features like these: fuel-metering Power-Jet carburetor, durable precision bearings, aluminized inlet valves, hard-faced exhaust valves and full-flow oil filter.

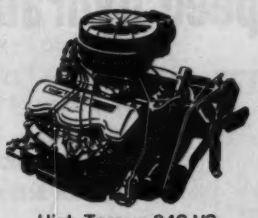
High Torque 348 V8—Standard in Series 80 models (18,500- to 25,000-lb. GVW range). Provides 220 hp and 325 ft.-lbs. of torque to keep big loads moving at lowest cost. Comes equipped with scores of heavy-duty design features such as inside/outside carburetor air system that helps stabilize air supply temperature, highest quality valves and bearings, precision-engineered lubrication, cooling and ventilation systems. This one assures years of low maintenance, high mileage operation.

High Torque 409 V8—Optional in Series 80 models (18,500- to 25,000-lb. GVW range). It's the biggest, *pullingest* engine that ever powered a Chevy heavyweight. With a whopping 252 hp and 390 ft.-lbs. of torque, the High Torque 409 V8 is made to order for *extra* rugged runs. Long life and trouble-free performance are sure things, thanks to such special heavy-duty features as induction-hardened valve seats, forged steel crankshaft, new 4-barrel carburetor, to mention just a few. (For *all* the details on High Torque power for your job, see your Chevy dealer.)... Chevrolet Division of General Motors, Detroit 2, Michigan.

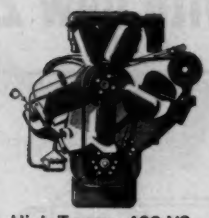


High Torque 261 Six

High Torque 327 V8



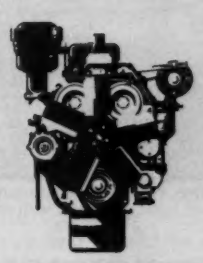
High Torque 348 V8



High Torque 409 V8

PLUS NEW GENERAL MOTORS SERIES 53 DIESELS

For '62 Chevrolet introduces new GM Diesels for medium- and heavy-duty trucks! Specially designed for lowest cost performance in Series D60 and D60-H (15,000 to 23,000 GVW) is the proved 130-hp GM 4-53 Diesel. And, for haulers who work in the Chevy Series 80 range (18,500 to 25,000 lbs.), the new 195-hp GM 6V-53 Diesel will be available soon. If you work your trucks near the limit with heavy loads, high mileages, severe stop and go or excessive idling, you're in for a pleasant shock when you find out how much a Chevy Diesel can save you!



built to keep running and running and running and running and running and running and running and running

1962 CHEVROLET JOBMASTER TRUCKS

CHEVROLET

Circle 23 on Reader Service Card

JOB TALK . . .

continued from page 21

Specs called for line drilling to keep a straight face on the side of the cliff from which the relocated road cantilevers.

J. Robert Bazley, Inc., of Pottsville, Pa., fitted two Ingersoll-Rand DA-45 drifters on a PLM-2 trench drill mounting and suspended the rig from the boom of a Lima 1201 crawler crane. The dual drills, which are normally suspended from a side-boom tractor, bored 3½-in.-dia holes to depths of as much as 30 ft through hard sandstone conglomerate. An I-R 900 Gyro-Flo rotary compressor supplied air.

Walkie-Talkies Speed Erection

A Bethlehem Steel Co. erection crew is using walkie-talkies to supplement a public address system during erection of the 30-story Bankers Trust Building in New York City.

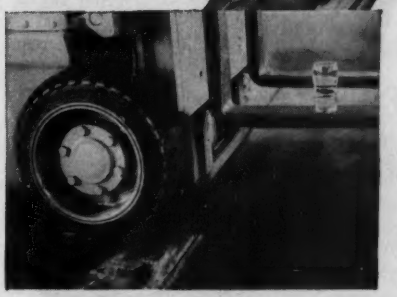
The walkies-talkies overcome some of the limitations of the P. A. system by providing greater flexibility. During the foundation stage, engineers with walkie-talkies directed delivery of steel without having to cross back and forth over railroad tracks that run beneath the building to reach fixed mikes. The walkie-talkies now are providing communication between the erection crew atop the rising structure and surveyors at ground level.

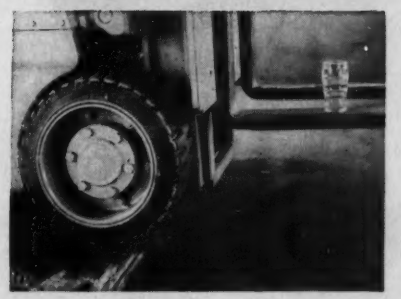
The system consists of a base set, licensed by the FCC to operate on citizen's band, and two portable sets made by Osborne Electronics.

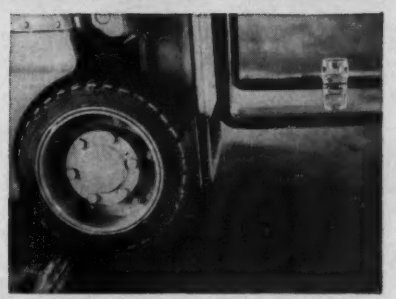
Now Available in Production Quantities . . .

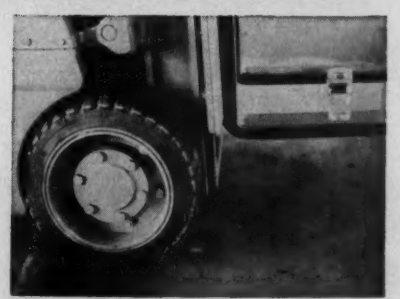
NEW HYDROSTATIC TRANSMISSION SYSTEM THAT OUTPERFORMS ALL OTHER TYPES

With throttle set at idle, a DYNAPOWER-ed Lift Truck eases up, over and down obstacle without disturbing water in glass . . . will move as easily up and down grades; on ice and snow; over sand, gravel and mud.



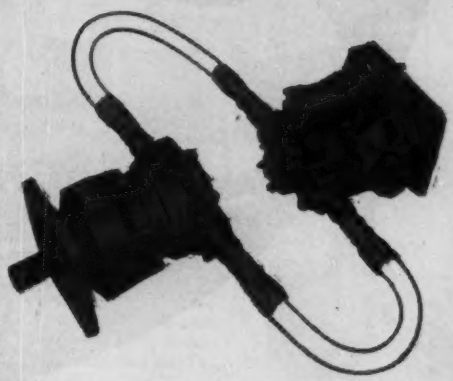






DYNAPOWER®

PAYS OFF IN PERFORMANCE



DYNAPOWER uses a separate axial piston hydraulic pump and motor that produces torque as required up to 300 lb. ft. The variable pump provides an infinitely variable speed ratio and displaces a maximum of 4.8 cu. in./rev. The transmission is rated at a normal 60 HP but handles peak requirements up to 90.

As a result, DYNAPOWER-ed off-road vehicles are able to deliver high torque at low RPM. Provide infinitely variable speeds in *either* direction without clutches or gear changers. Give faster smoother response. Reduce use of service brakes with Power Absorption Braking. And, simplify maintenance due to elimination of the drive train.

Application possibilities are endless. DYNAPOWER increases the power capabilities of LIFT TRUCKS without increasing size. DYNAPOWER increases useable HP output of FARM EQUIPMENT without prohibitive increase in cost. DYNAPOWER improves the vehicle geometry of MOBILE CONCRETE MIXERS and increases their capacity. DYNAPOWER reduces the high heat generation of constant volume open center type systems in SCRAPERS AND FRONTEND LOADERS.

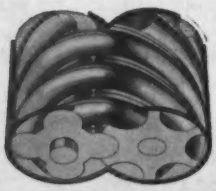
DYNAPOWER has set new standards of performance and any off-road vehicle that cannot meet these standards will suffer in the buyers' market of 1962. Be sure you know all there is to know about DYNAPOWER, today! Write:

WATERTOWN DIVISION
THE NEW YORK AIR BRAKE COMPANY

1511 STARBUCK AVENUE • WATERTOWN, N. Y.

1200-cfm SINGLE-ENGINE PORTABLE COMPRESSORS

. . . performance-proved on the job!



The SPIRO-FLO uses a radically improved method of cycloidal compression in which these two perfectly balanced rotors are the *only* moving parts.

The Ingersoll-Rand SPIRO-FLO – the world's *first* 1200-cfm single-engine portable air compressor – has already proved its stamina and dependability on a wide range of heavy-duty construction jobs. No bigger than a 900-cfm machine and actually weighing 1000 pounds *less*, the SPIRO-FLO does the work of two or more compressors with important savings in space, weight and cost. Ask your local Ingersoll-Rand representative or distributor for complete information.

Ingersoll-Rand.
30BA2 11 Broadway, New York 4, N.Y.
THE WORLD'S MOST COMPREHENSIVE COMPRESSOR EXPERIENCE

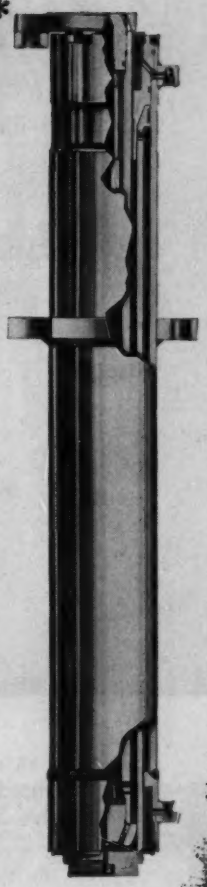
Circle 26 on Reader Service Card ▲

Circle 27 on Reader Service Card ➤

YALE gas truck lift ...muscled by Ward Hydronics* cylinder

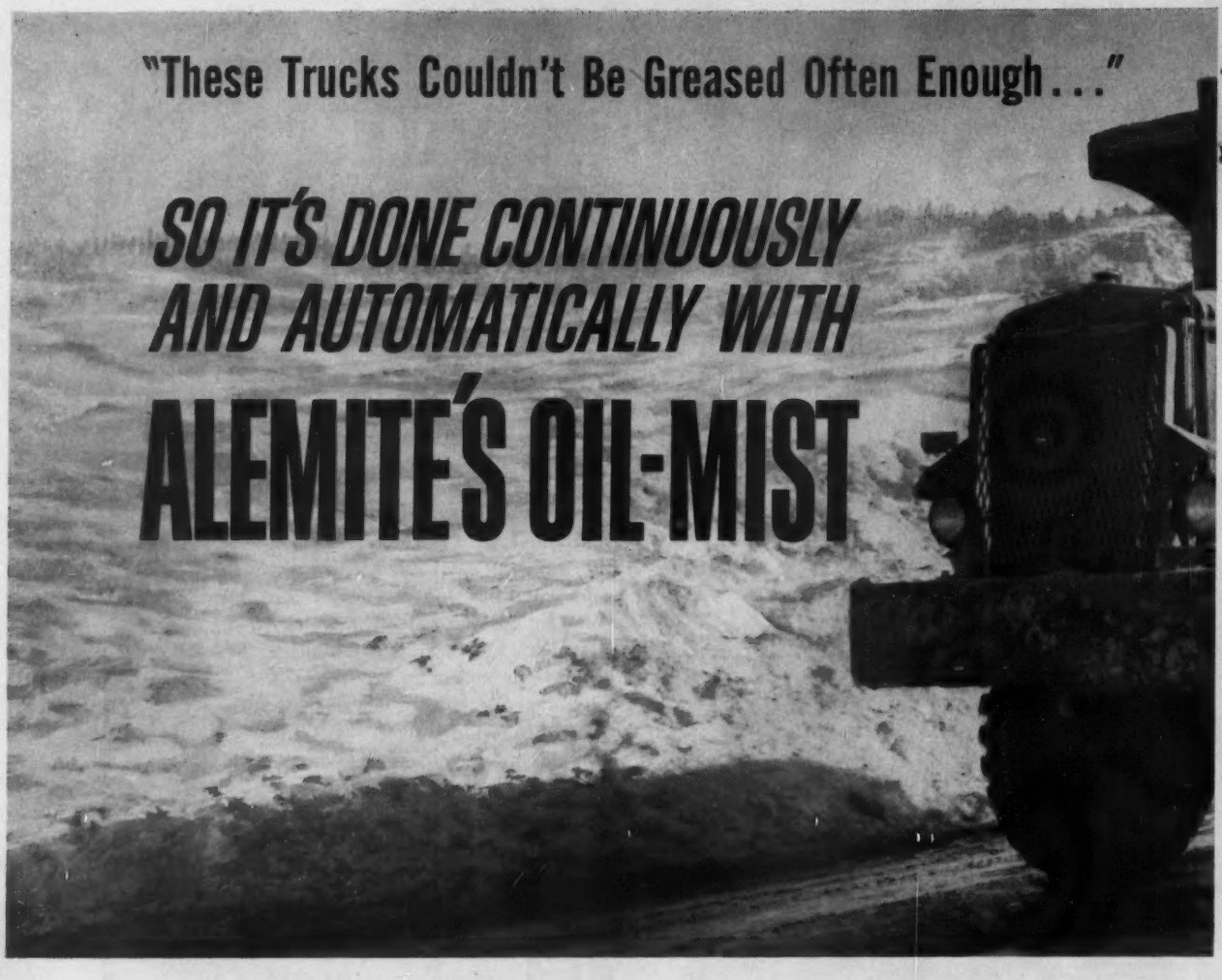
Yale's big industrial fork lift gas truck heaves two tons up eighteen feet in seconds, then gently eases the load down into the desired position. That takes muscle. And to repeat such lifts safely and reliably for years on end, when maintenance may be indifferent or non-existent, when loading may be haphazard, takes stamina. Ward Hydronics is an approved supplier of the Yale & Towne designed triple lift cylinder used. The Ward cylinder provides the muscle and the stamina needed... and it does so within sharp pencil competitive limits. Outstanding for resistance to breakage from impact or twist, outstanding for low maintenance say operators.

For quotations, for cylinder design aid, write Ward Hydronics Inc., Alden, N.Y.



Ductile iron castings, MIG welds, 0.001-in per side hard chrome plate, bronze guide, gall-freed pilot are some of the features that give this Ward Hydronics triple lift cylinder exceptional strength and life.

*Trade name, Ward Hydronics Inc.



After 18 months of continuous, round-the-clock truck operations in the quarry . . . the British-Canadian Mine of Asbestos Corporation, Ltd., Thetford Mines, Quebec, reports this unbelievable but factual story.

During this period, each truck hauled *400 additional tons* of ore each week . . . by eliminating stops for chassis lubrication.

Interval between overhauls has been extended 20% due to constant lubrication of vital parts . . . from 20,000 gallons of fuel consumed to 24,000—or from 18 months to 24 months.

Labor Savings: Before the Oil-Mist installation, greasing alone required 20 man hours per week—per truck, with an average pay rate of $2.05 an hour.

Efficiency of Lubrication: Maximum service use from minimum volume. Cost reduced to less than one-third the hourly rate for first class mechanic—for a full month of positive lubrication!

Seasonal Operation: Oil-Mist has been proven equally efficient in weather at 30°-below or 100°-above. A simple change of oil in lubricator suffices.

Parts Replacement: After 18 months of continuous operation, one king pin and bushing was replaced. (One other—still serviceable—was replaced to show visitors and quiet doubters.)

Now this fleet of trucks is protected 100% of the time by Alemite Oil-Mist Automatic *low-pressure* Lubrication. Alemite Oil-Mist delivers continuous, regulated amounts of lubricant to desired points on trucks and heavy-duty off-highway equipment. A continuous flow of air cools and protects all points in the system—prevents entry of dirt and abrasives into the lubricant.

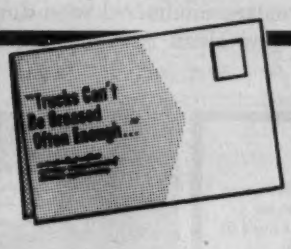
The British-Canadian Mine of Asbestos Corporation, Limited, today is enjoying the highest percentage of availability of trucks it has ever had, company officials report. Oil-Mist lubrication has been a factor in maintaining this present high availability at its existing level, mine officials stated.

Oil-Mist Lubricator is mounted in cab with hose lines carrying air-borne lubrication to 38 points of application – lubrication is accomplished continuously and automatically.

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

Dept. R-111, 1850 Diversey Parkway, Chicago 14, Illinois



For more information and for a complete account of how Alemite Oil-Mist Lubrication helped this Canadian Asbestos Mining Firm, send today for a FREE illustrated brochure.

Name_____

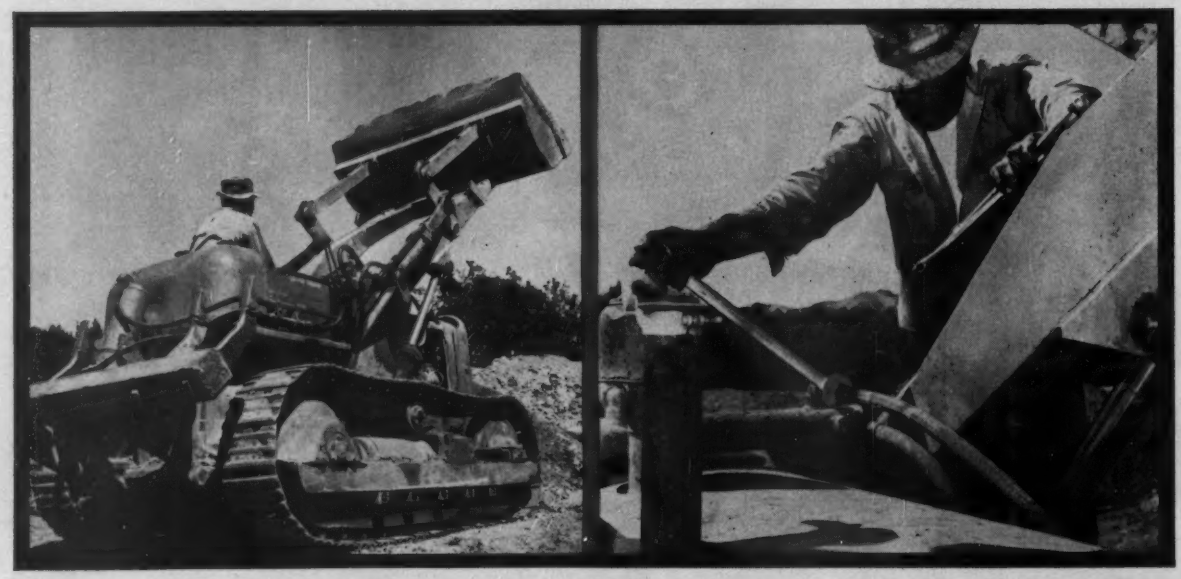
Address_____

City_____ Zone____ State_____

Circle 29 on Reader Service Card

Breakdowns Are Rare, Replacements Fast With Aeroquip Hose and Reusable Fittings

declares Stolte Inc., Oakland, California



Left: Stolte equipment stays at work with the help of Aeroquip Products.
Right: Replacement Aeroquip Hose Line is assembled with ordinary hand tools.

This large west coast contractor specializes in heavy construction: tunnels, bridges, industrial buildings. They employ about 150 pieces of major equipment in the field.

Maintenance is of major importance. High levels of reliability must be met. That's why Stolte management has standardized on Aeroquip Hose and Reusable Fittings to replace both rigid and flexible lines.

Hose line breakdowns are minimized with durable, dependable Aeroquip Hose. And infrequent replacements, where required, are amazingly simple to make. That's because bulk Aeroquip Hose can be cut to the exact length required, then quickly fitted with Aeroquip Reusable Fittings, right on the job site. Installation is just a few minutes work. Equipment is back on the job fast, with downtime kept to a minimum.

Discover why Aeroquip Hose Line breakdowns are a rarity. Ask your Aeroquip Distributor for the information. He's a fluid line specialist listed in the Yellow Pages under "Hose."

Ask your Aeroquip Distributor or write for a copy of "Guide for Routing and Installation of Flexible Hose Assemblies."

Aeroquip

AEROQUIP CORPORATION • JACKSON, MICHIGAN
INDUSTRIAL DIVISION

Circle 30 on Reader Service Card

TROJAN

Builds in "Extra" Strength with one-piece side frame construction

Trojan cuts the entire side frame from extra-heavy steel for maximum strength, durability, and operational simplicity . . . Obviously, this is a more costly operation; but the results are worth it! . . . The smooth, continuous contour completely eliminates the undercuts for bracket attachments necessary in ordinary built-up frame sections — therefore, eliminates the possible stress concentrations that lead to frame failure . . . This also allows complete protection *inside the frame* for fuel lines, wiring and hydraulic lines — shielded by a solid wall of steel from possible damage during rough work. This advanced Trojan technique means fewer parts and closer dimensional control — plus the elimination of potential trouble spots due to joining members that may not be of uniform strength . . . In addition, Trojan's unique "wide foot" design of frame connection adds rugged strength to the rear cradle supports. The frame is just another example of the extra care that goes into the construction of every Trojan — extra care that results in complete dependability on the job . . . Ask your Trojan distributor for a point-by-point inspection or an on the job demonstration of Trojan's seven-model line with lift capacities from 7,000 to 24,000 lbs.

AD NO. 44-33

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

Circle 31 on Reader Service Card

Roller Cam Action of Over-Center Clutches Reduces Wear, Pressure and Adjustments

Rockford exclusive anti-friction roller cams increase clutch life, lower pressure needed to engage and release, and reduce clutch adjustments. Precision-ground, hardened steel rollers force pressure plate against facing and flywheel for smooth, powerful engagements. Actuation progresses from "release" to "on-center" to the slightly "over-center" locked position. Operated by hand lever, Rockford Over-Center Clutches remain in or out of engagement until changed by the operator. Clutches fit flat or counterbored flywheels. Oil or dry operation. Torque loads from 365 to 3,000 lb. ft. Write today for illustrated brochure.

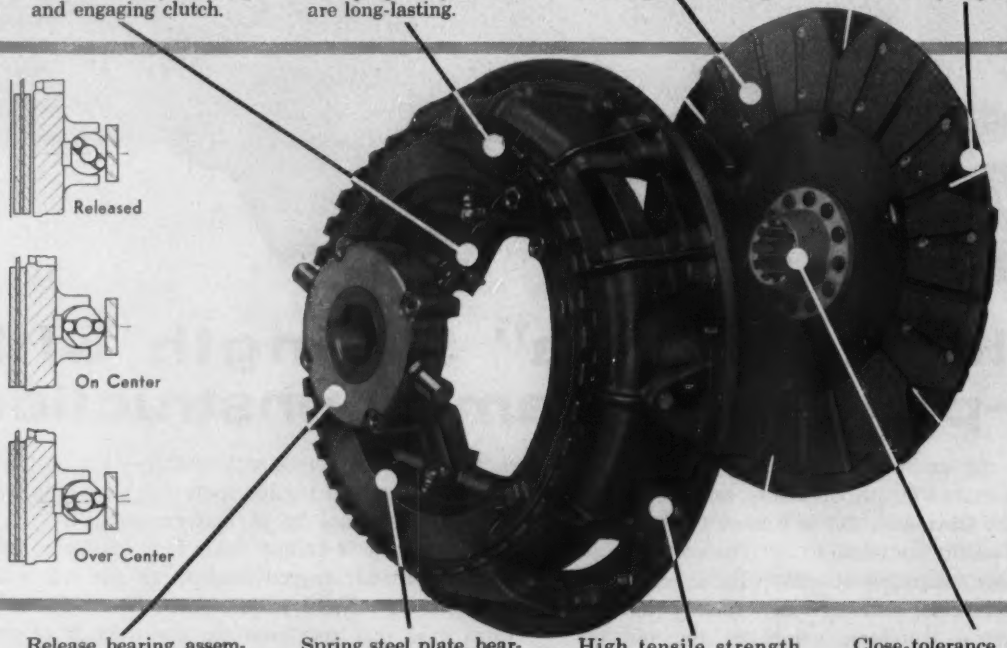
Allis-Chalmers Crawler equipped with Rockford Over-Center Clutch

Patented anti-friction roller cams reduce wear, adjustments, and lever pressure. Slight pressure to rollers forces pressure plate and facing against flywheel, instantaneously locking and engaging clutch.

Positive-lock adjusting ring allows fine adjustments for longer life and smoother starts. Simply release lock and turn to exact engaging position. Positive-lock prevents "creeping". Adjustments are long-lasting.

High-test facings give extra-long clutch life, reduce scoring, and greatly cut costs of downtime, replacement and labor. Strong, lightweight construction permits easy shifting and braking.

Segmental slots prevent "dishing"... even under extreme heat conditions. Rotary surface grinding assures perfect, uniform flatness. Core plate is made of special high-carbon spring steel.



Release bearing assembly consists of bronze or ball bearings. Clutch is actuated from hand lever to yoke contact on trunnions. Pivot pins give direct, smooth actuation between release sleeve and cam arms.

Spring steel plate, bearing against roller cams, yields slightly upon actuation. This assures extremely smooth engagements, relieves cover plate of strains, maintains uniform pressure, and gives longer life.

High tensile strength cover plate assures safe operation. Compact, low-inertia design prevents gear clashing and delayed shifting. Dynamic and static balancing of each clutch eliminates vibration.

Close-tolerance splined hub assures perfect disc alignment. Through-hardened hub gives long life. Bolt circle and pilot dia. accurately locate cover plates. Precision manufacturing eliminates misalignment.

ROCKFORD CLUTCH

1207 WINDSOR ROAD ◆ ROCKFORD, ILLINOIS

Export Sales Borg-Warner International, 36 South Wabash, Chicago, Ill.

ROCKFORD CLUTCH DIVISION

BW

DIVISION OF BORG-WARNER

Circle 32 on Reader Service Card

On Deep South Construction Company
GULF MAKES THINGS

After grading and paving two airfields at Fort Rucker, Alabama, Deep South Construction Company is now building a third airfield at the Army's training center for helicopter and liaison plane pilots.

This Montgomery, Alabama, contractor will move some 700,000 cubic yards of earth and then grade and pave four 2000-foot runways and a huge aircraft parking area. To date, Deep South has averaged about 7000 yards each day under the critical eye of Glenn Owens, Project Superintendent.

Mr. Owens won't risk any chance of equipment downtime attributable to lubricants. He sticks to a strict PM program that was set up by Jack L. Carr, president of Deep South Construction Company.

To supplement the PM program, Mr. Carr asked Gulf to make a survey that would simplify Deep South's lubricant inventory.

Gulf engineers made these recommendations: (1) Gulf Super-Duty motor oil, a series 3 oil for crankcases of all high-output earthmoving equipment, (2) Gulflex® A, a multi-purpose, lithium-base grease for all grease-lubricated applications. Result: Deep South enjoys maximum equipment availability with a small inventory of lubricants. All equipment is powered with clean burning Gulf diesel fuel.

To get the most out of your equipment, try Gulf

RCA "e" Line 2-Way Radio...

Crashes the Interference Barrier!

Knocks Down Costs!

Opens the way to broader uses of 2-way radio...in any business!

Here's new Efficiency in mobile communications—RCA's new "E" Line—a quality 450 MC 2-way radio that screens out co-channel interference, skip signals and ignition noise, yet keeps costs down to a minimum!

This is the finest UHF 2-way radio ever offered by RCA... and at the lowest price! Combined control head, speaker and power supply unit mounts in less than 7" space to completely eliminate under-dash clutter. Transistor powered, the "E" Line is easiest to install, and operate, 6 or 12 volt power supply, interchangeable, without wire changes or soldering.

Now, the money-making, time-saving advantages of 2-way radio are available for every business! Your choice of lease or purchase plans. Send coupon for complete information.

RCA The Most Trusted Name in Radio
RADIO CORPORATION OF AMERICA

RADIO CORPORATION OF AMERICA
Telecommunication Center, Dept. B-203
Meadow Lands, Pa.

☐ Please send literature on the new RCA "E-Line" 2-Way Radio for 450 mc band.

☐ Have Communications Specialist call.

NAME_____ TITLE_____

FIRM_____

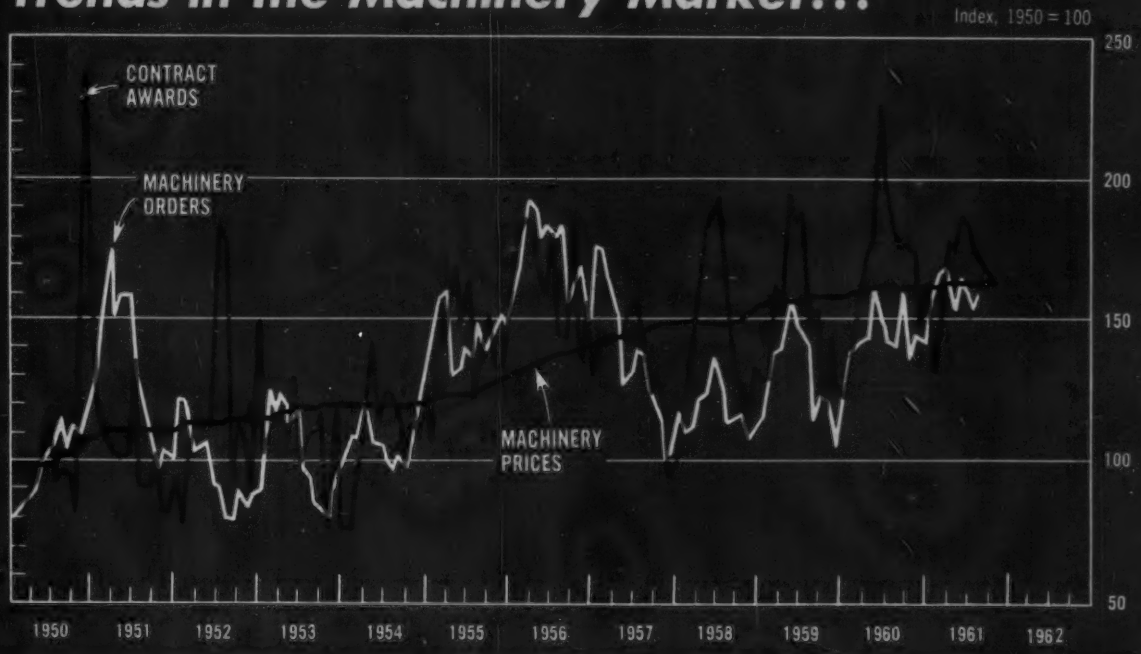
TYPE OF BUSINESS_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Circle 37 on Reader Service Card

Trends in the Machinery Market...



List Prices and New Orders Hold Steady

NO CHANGES in f.o.b. list prices for major types of construction equipment occurred between Aug. 15 and Sept. 15, according to the U.S. Bureau of Labor Statistics.

But revised Aug. 15 indexes show a price reduction for heavy-duty graders and slight increases for crawler tractors of 50-74 dbhp and for portable concrete mixers with 11-cu-ft capacity. These changes led BLS to revise its over-all equipment price index slightly upward to 178.5 for August, based on average prices in 1947-49 as 100. It remains at this high-water mark for September, 1% above its September 1960 value.

There has been a more liberal sprinkling of price reductions in the past year, as shown in the table. BLS price sub-indexes are below a year ago in one-third of the categories listed. Less than one-half show an increase.

Prices are down or steady compared to a year ago for scrapers, graders, bulldozer attachments, cable power control units for tractors, truck mixers and pavers, and off-highway trucks.

Orders for construction equipment flowed to manufacturers in August at a slightly higher rate than in July. The new orders index edged up to 158 from July's 157, based on average monthly dollar volume in 1950 as 100. August was 13% above a year ago and the second highest on record for the month. McGraw-Hill computes the index.

While the mild summer slide in equipment orders seemed to halt in August, the heavy construction contract award index slipped each month from a June high of 186 to 161 in September.

Price Index

	SEPT. 1961	MONTH AGO	YEAR AGO	% CHANGE 1960-1961
All Types of Equipment	178.5	178.5*	176.7	+ 1.0
Cranes; Draglines, Shovels	173.7	173.7	173.6	+ 0.1
Shovel, ½ cu yd	173.1	173.1	167.9	+ 3.1
Shovel, ¾ cu yd	178.8	178.8	175.4	+ 1.9
Shovel, 1-1½ cu yd	191.0	191.0	189.3	+ 0.9
Shovel, 2-2½ cu yd	169.1	169.1	170.3	— 0.7
Shovel, 3-3½ cu yd	159.8	159.8	167.8	— 4.8
Shovel, 6 cu yd	201.2	201.2	197.9	+ 1.7
Crane, truck mounted	165.9	165.9	168.2	— 2.4
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	162.9	162.9	162.9	0
Bucket, dragline	169.3	169.3	169.3	0
Scrapers and Graders	165.4	165.4*	166.6	— 0.8
Scraper, 4 wheel, 8-10.5 cu yd	145.3	145.3	155.0	— 6.3
Scraper, 4 wheel, 12-15 cu yd	153.3	153.3	156.8	— 2.2
Scraper, 2 wheel, 15-19.5 cu yd (a)	126.5	126.2	126.2	0
Grader, heavy duty	173.5	173.5*	174.1	0.4
Grader, light and medium	170.9	170.9	170.9	0
Tractors (non-farm, incl Industrial)	195.4	195.4*	193.6	+ 0.9
Wheel type, off-highway (a)	127.6	127.6	129.2	— 1.3
Crawler type, 50-74 dph	207.5	207.5	203.5	+ 2.0
75-99 dph	204.8	204.8	204.3	+ 0.2
100-154 dph	200.7	200.7	198.2	+ 1.3
155-200 dph	208.6	208.6	203.3	+ 2.6
Machinery, Tractor Mounted	177.9	177.9	176.2	+ 1.0
Dozer, cable controlled	164.8	164.8	164.8	0
Dozer, hydraulic controlled	201.4	201.4	201.9	— 0.3
Cable power control unit	148.8	148.8	152.9	— 2.7
Loader, tractor shovel	166.7	166.7	163.2	+ 2.1
Specialized Machinery	159.6	159.6	158.6	+ 0.6
Ditcher	153.8	153.8	153.8	0
Roller, tandem	228.5	228.5	226.4	+ 0.9
Roller, 3 wheel	178.7	178.7	178.7	0
Ripper and rooter	164.5	164.5	156.6	+ 5.0
Dewatering pump, 10 M gph	108.5	108.5	111.5	— 2.7
Dewatering pump, 90 M gph	156.1	156.1	151.5	+ 3.0
Portable Air Compressors	181.5	181.5*	167.5	+ 8.4
Contractor's Air Tools	190.5	190.5	181.8	+ 4.9
Mixers, Pavers, Spreaders	184.2	184.2*	181.8	+ 1.5
Mixer, portable, 11 cu ft	172.5	172.5*	166.8	+ 3.4
Mixer, portable 16 cu ft	175.8	175.8	172.7	+ 1.8
Mixer, truck, 6 cu yd	131.1	131.1	135.1	— 3.0
Mixer, paving, 34 cu ft	192.9	192.9	196.7	— 1.9
Concrete finisher & spreader	209.6	209.6	201.9	+ 3.8
Bituminous distributor	124.5	124.5	126.2	— 1.3
Bituminous spreader	179.4	179.4	179.4	0
Bituminous paver	170.9	170.9	165.6	+ 3.2
Off-Highway Trucks, Wagons (b)	102.3	102.3	102.5	— 0.2
Contractors off-highway truck (b)	102.0	102.0	102.0	0
Trailer dump wagon (b)	104.5	104.5	106.7	— 2.1

● (a) January, 1955 = 100 ● (b) January, 1958 = 100 *Revised
BLS Primary Market Price Indexes, U. S. Department of Labor, 1947-49 = 100

NOW...A SCRAPER ROPE THAT'S GUARANTEED TO LAST LONGER

SCRAPER FLEX

TRADE MARK

GUARANTEE

This guarantee assures you of longer rope life using Scraper FleX, or an adjustment to an improved plow steel rope price will be made.

Here it is at last—a rope for scrapers and dozers that can help you slash equipment downtime to the bone! It's CF&I-Wickwire's new Scraper FleX, the rope that offers you these **exclusive** advantages:

- Scraper FleX lasts longer on the toughest earth-moving jobs because it's specially designed for 'dozers and scrapers . . . and because it's a Double Gray®-X rope. Double Gray-X is the result of an entirely new wire-drawing process developed by CF&I-Wickwire. The use of molybdenum disulphide produces powerful resistance to bending fatigue by creating a molecular shield that prevents the individual wires from grinding together as the rope operates.
- Scraper FleX has extra strength—15% higher than the catalog breaking strength of improved plow steel rope with IWRC.

The only way you can lose is by **not** using Scraper FleX. Avoid that mistake by contacting your nearby CF&I office for full details—today.

Steel For durable industrial products

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities

Circle 40 on Reader Service Card

"Only Payhaulers dare move full loads down this 38% grade!"

Exclusive Torqmatic brake lets International Payhaulers speed full 27-ton loads down the mountain —a dangerous trip in any other rig. Early in the job, when this steep grade was too much for other haulers, six 95's kept production going. This is the toughest section of Slate, Hall & Hamilton's $8,000,000 roadbuilding contract.

Other rigs sit idle while "95" Payhauler units move 27-ton loads down mile-long haul road...

Slate, Hall & Hamilton of Portland are building 4-lane US Route 5 through Oregon's rugged coastal range. Contract calls for moving 4,800,000 cu. yds. of 20% rock material. Toughest part of the job is 330-ft. cut through high rocky outcrop above the Sacramento River. Existing Route 99 and main line of Southern Pacific Railroad—both kept open—run between the job and the river. Haul roads, crowded against the cliff, are steep and narrow, with hairpin curves.

"I wish we had more Payhaulers on this hill," says Owner E. D. Slate. "They took out full loads on a mile-long road with a 38% grade where we didn't dare put other trucks. Even after we cut the maximum grade to 28% other rigs only carry half a load. Thanks to that Torqmatic brake, we're getting full production from the Payhaulers!"

Downgrade hauling stability is built right into the Payhauler. Positive Torqmatic braking, standard equipment on the 95, gives the operator confidence to use best haul speeds, even on the steepest grade with a full load. Fingertip power steering and convenient brake control lever further increase operator ease and safety—add up to extra haul cycles on every job. Prove to yourself how the 27-ton 95 or the 19-ton 65 will boost production on your spread. Call your International Construction Equipment Distributor and arrange for a Payhauler demonstration today!

International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Circle 41 on Reader Service Card

GRAB JOBS from "Break-Even" Bidders . .

"Live-Track" power-steering, plus On-the-Go

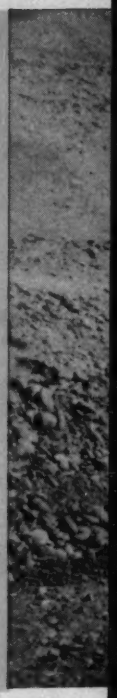
To make a turn, you simply change the speed of a TD-25 track with "live track" Planet Power-steering. This way, you keep full power and traction on both tracks to assure full-load turning. Load-limiting "dead-track drag" doesn't sabotage your bids.

To handle big offset loads, or to counteract the side draft of benching without sluing or "bank-nosing," simply shift the TD-25's load-side track to high range; leave the other track in low. You stay on course, deliver full loads or make full cuts, full time.

To keep full loads on the move, full time, through tough or easy going, use instant-acting, on-the-go Hi-Lo, power-shifting. Cut-to-fill matching of power to condition goes far to prevent payload spillage. Fast, easy TD-25 power-shifting is a built-in bonus of Planet Power-steering!

For constant-contact push-loading, apply full TD-25 power with planetary track control, get full speed and production without scraper-mauling impact. Prevent push-block banging damage.

Prove to yourself how turning affects earning. See how TD-25 advantages let you grab jobs from "break-even" bidders and still make profits. Let your International Construction Equipment Distributor demonstrate!

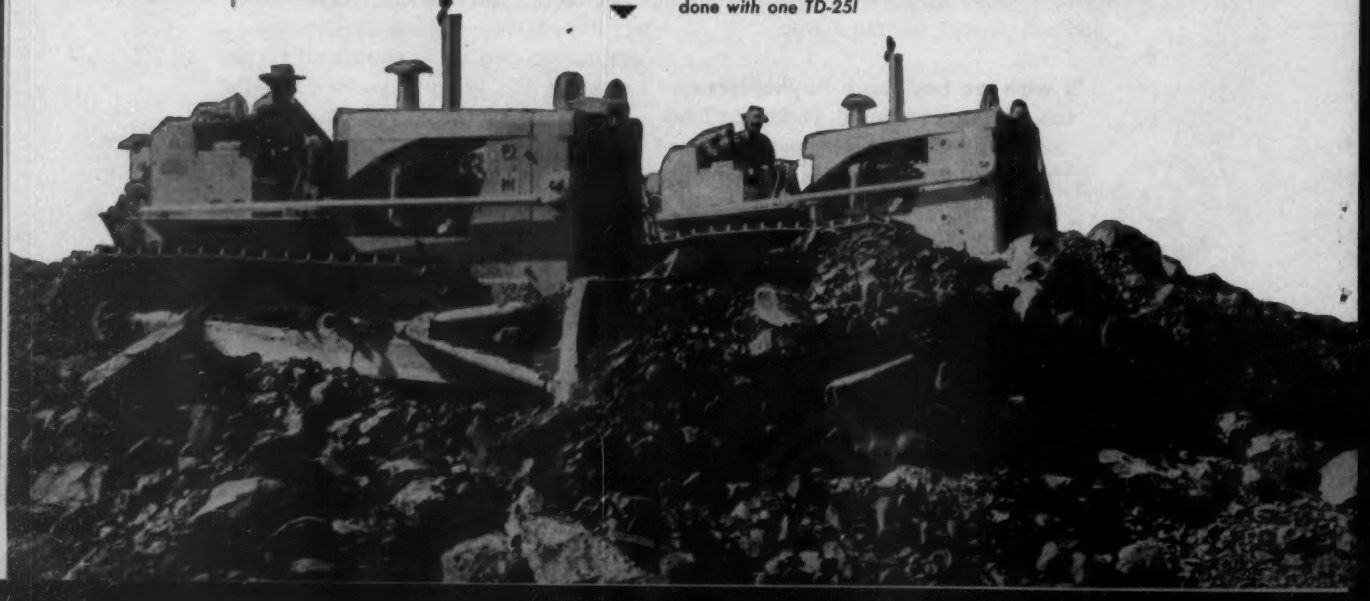


International® *Construction Equipment*

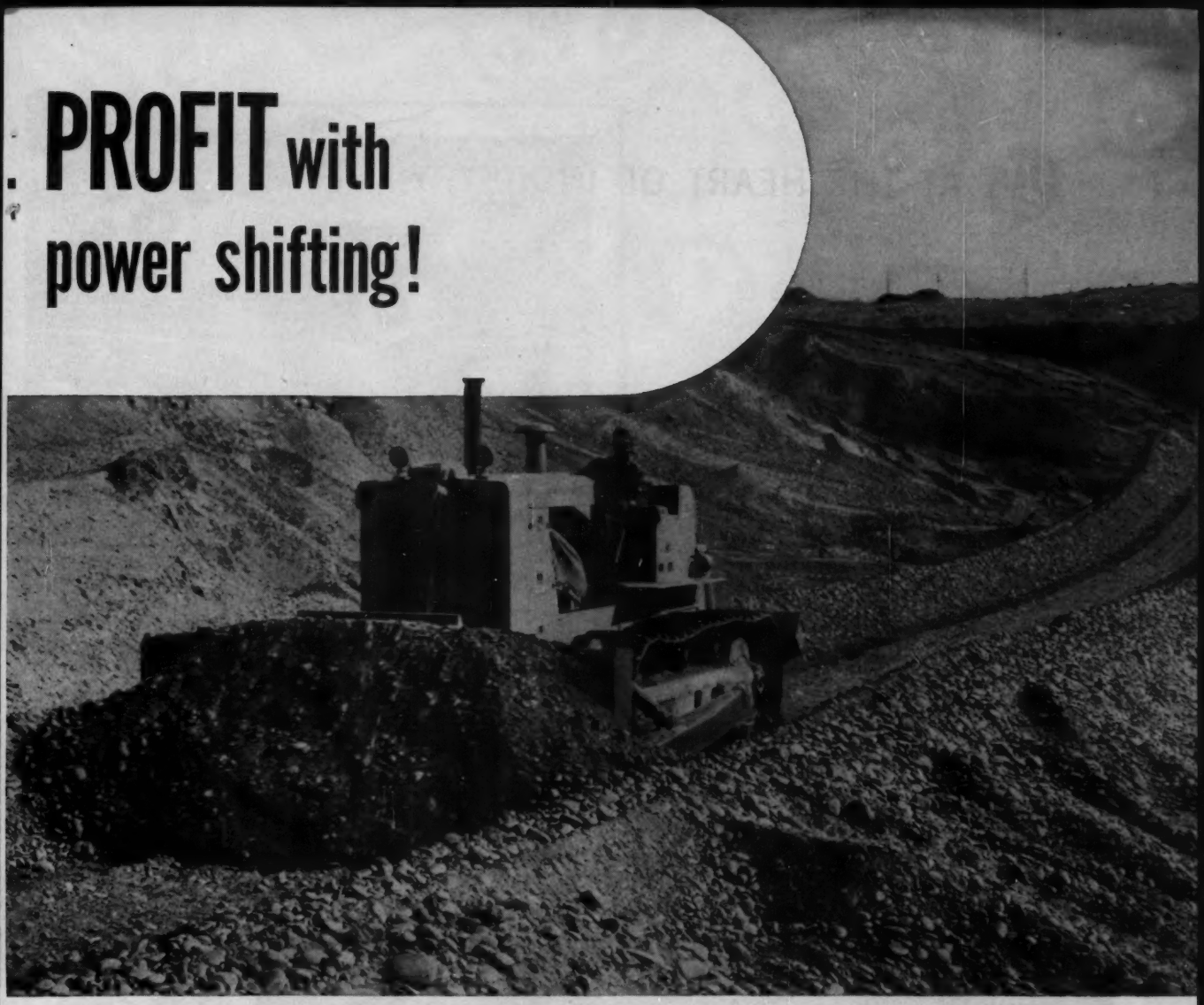
International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

"On course" steering with offset loads means full-capacity production even in rock-laden material. To prevent needless zigzagging and loss of momentum, a "25" operator simply changes the speed of one track to put extra power leverage where needed to meet changing conditions. These two machines, pioneering a 107-foot deep cut, are members of a fleet of seven International TD-25's on a Kentucky Turnpike job in rocky, hilly terrain.

Pushes of over 600 feet pay off for this New Mexico contractor—producing sub-base gravel for a North Albuquerque highway. Instant speed control of either or both tracks with the planetary transmission means positive load-control—to heap "ripped" gravel and "run" to the crusher hopper. Then the "25's" high reverse of 7.5 mph means fast back-up for the next push. What would have been a costly 2-tractor operation is efficiently done *with one TD-25!*



. PROFIT with power shifting!



Steady full-power traction on both tracks full time assures ample push to beat the grade and handle big loads of tractor-ripped bentonite at an Arizona mine. This TD-25 keeps busy removing overburden, ripping and stockpiling the ore. Only the "25" gives you the power-wallop of the free-breathing, dual-valved DT-817 diesel—with 230 turbocharged hp. Push-button direct starting saves operating time—operator effort!

Planetary track speed control lets you turn heavy offset loads or push straight ahead with them—without profit-robbing spillage or time waste. See how this planet-drive "25" beats king-sized clutch-steered crawler capacity with 2-finger ease—overcoming the sidedraft of bulldozing random-dumped dirt and boulders on a Virginia road job. And right where clutch-steered king-sized crawlers waste power and momentum, TD-25's can heap-load scrapers in record time!

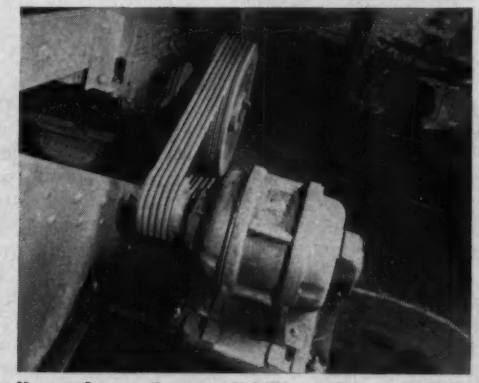
YOU EARN WITH WHAT YOU CAN TURN WITH!

Long after other hose have failed from the cuts, abrasion, and abuse of heavy-duty work, U. S. Matchless® Air Hose can be seen powering equipment at mining and construction sites everywhere. Its unique ability to withstand the toughest treatment is but one reason why U. S. Rubber is the largest producer of hose in the world, with a complete line of hose for every industrial need.

H 101

"On the job 3 times longer than belts previously used," says a co-owner of a Texas producer of foundry, chemical, and specialized sands about US HTB Elevator Belts. "We need belts that give long service at heats to 450°F, withstand terrific weight plus the abrasive action of sand. US Belts have never failed . . . never caused lost production or downtime."

EB 112



Known for maximum reliability, safety and profit, U. S. Royal V-Belts provide top efficiency, exceptional length stability, uniformity and long service life on all types of drives. You'll profit from the driving power of U. S. Royal V-Belts on conveyor, elevator, and loading-boom equipment; crushers, breakers, dryers and pumps; ventilator and cooling fans.

VB 109

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U. S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U. S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

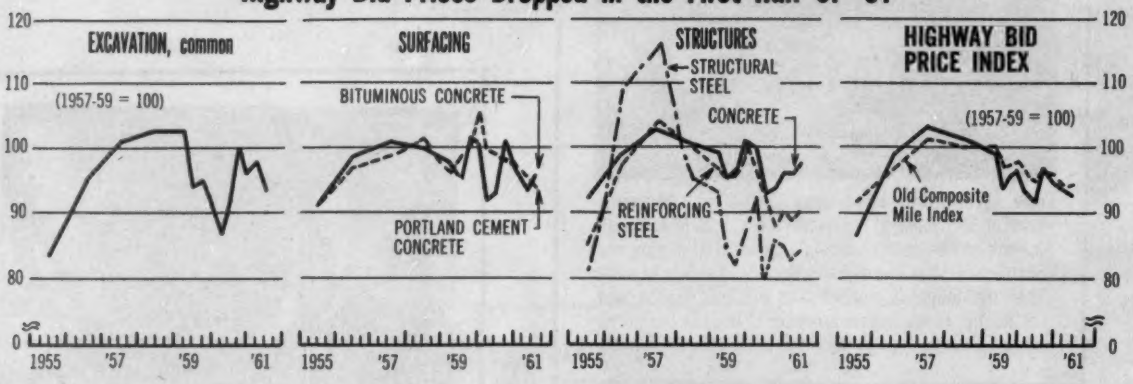
WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

Circle 45 on Reader Service Card

Highway Bid Prices Dropped in the First Half of '61



How New Bid Index Works

A MODERNIZED, more sensitive quarterly highway bid price index now is available to contractors. The U.S. Bureau of Public Roads is about to shelve its Composite Mile Price Index because it became obsolete due to advances in highway and bridge design during the past three decades. After the fourth quarter of this year, only the new index will be computed. But there will be an overlap of 11 yr annually, and 3 yr quarterly.

The new index should prove more useful and more accurate than its predecessor. It adds a separate bid price series and a price subindex for asphaltic concrete pavement. The Composite Mile Index showed Portland cement concrete pavement prices only.

The new index is more representative of current highway and bridge design. It uses average unit prices for key items—excavation, asphaltic and cement concrete pavement, structural concrete and steel—in proportions representing the total volume of these categories used on the federal-aid highway system during the three years 1957-59. By contrast, the Composite Mile Price Index had used average quantities per mile built in 1925-29 (hence, the "Composite Mile" label).

The new index also differs from the old in that its base period moves up to 1957-59=100 from the old index's base of 1925-29=100.

The chart above (extreme right panel) shows that the new highway bid price index will give almost the same trend results as the old Composite Mile Index. The new index moves in the same direction and in about the same degree as the old, except that it tends to be not quite as flat. Another important exception: The new index moved down 1.3% in the second quarter of '61, while the Composite Mile Index increased 0.8%. But there are few such examples of opposing trends in the over-all index.

A look at average unit prices shows up important differences, however. In the second quarter, common excavation dropped in the new index but was steady in the old; concrete pavement was down in the new index, up in the old; reinforcing steel was up in the new index, down in the old; structural steel was up in the new index, steady in the old. Structural concrete was up in both indexes, the only case of agreement in the second quarter.

Average bid prices also are quite different in magnitude and in degree of swing up or down between quarters. The revised average unit prices used in the new index are running higher than in the old series for common excavation and cement concrete pavement. But the new index's prices are lower for steel and structural concrete.

The 93.2 value of the new index (1957-59=100) says that contractor's bid prices for federal-aid projects let by state highway departments in the April-June quarter were 1.3% under the first quarter. But prices were still 1.4% higher than 1960's second quarter when severe competition forced bids to a dangerous low. Bids remain well below their 1957 high. These have fluctuated for the past 2½ yr between a high of 98.9 in the first quarter of 1959 to a low of 91.9 in the second quarter of 1960.

Although excavation bids re-

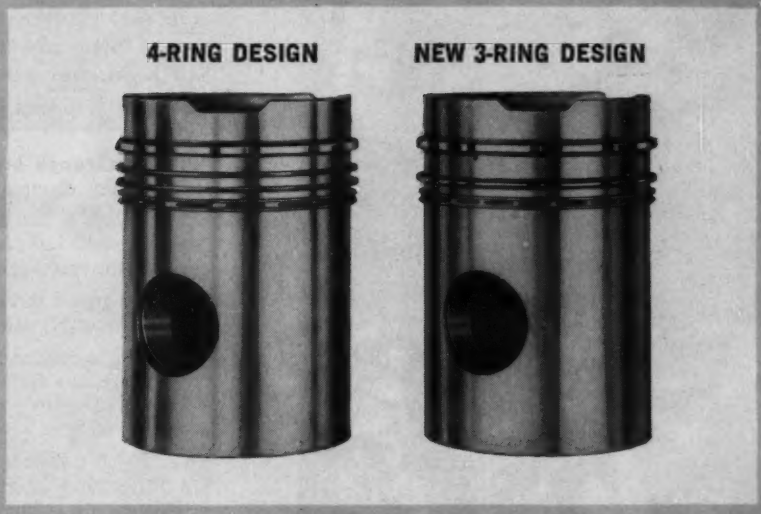
continued on page 50

Special report to users of Caterpillar D7, D8 and D9 Tractors:

CAT CATERPILLAR

Parts you can trust
...cost less per hour

New Piston and Ring Combination Cuts Oil Consumption 33-50% ...Lasts Hundreds of Hours Longer!



What makes it so different? Look at the two Caterpillar-made pistons. Notice in the new design that *both* compression rings are now deeply seated in grooved cast iron (indicated in yellow) instead of only the top ring. Since cast iron is able to resist groove "pound out," both compression rings are held firmly *longer* in the correct position for maximum ring-to-liner sealing. Compression loss and blow-by *behind* rings and around grooves is delayed hundreds of hours, too.

The new intermediate compression ring is a "twist" ring, so-called because it changes position in the groove during the power stroke. It actually "twists" so its face has *greater sealing area* at the liner than regular rings—reducing the number of compression rings normally required. At the same time, it thins the film of oil left by the regular oil control ring. This leaves less oil to burn away which contributes to the new piston's better oil control and longer ring life.

All rings now have a new look, too . . . *each and every* face is thickly chrome plated against wear. They are also "bright lapped" to such brilliance that any flaws can be easily seen and the faulty ring rejected. Such quality control assures almost perfect seating right from the start, eliminating break-in blow-by, slobbering and scuffing.

Cost? Pistons with the *extra* cast iron bands cost *slightly more*, but ring sets are less! Once you change over, your tractor maintains its power longer, your fuel and oil bills go down, and your next set of replacement rings will be less. Your Caterpillar Dealer has them in stock now.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment

what you've told us about POSITIVE-PRESSURE backhoe

After 2 years in the field, here's what you, Mr. Contractor, have gone on record to say about POSITIVE-PRESSURE on your jobs:

"Anything that steel will cut, this backhoe will dig."

"Ripping through layers of hardpan and sand without chopping, we find less cave-ins, less hand work and more production."

"Any non-believer can check with me because it's the best digging hoe I've ever seen."

"It really grinds through the hard stuff — no other machine can match its output."

"It will dig in rock and hard materials where other machines couldn't without shooting. We haven't had any problem digging through 30 inches of frost."

"We dug all the stone to here, but now the last 50 feet has made is necessary to use a jackhammer; it is almost solid, and you need the jackhammer. I don't think a similar machine could have dug this trench so far without the POSITIVE-PRESSURE."

"Provides greater production, enabling us in many cases to penetrate rock that would normally require blasting."

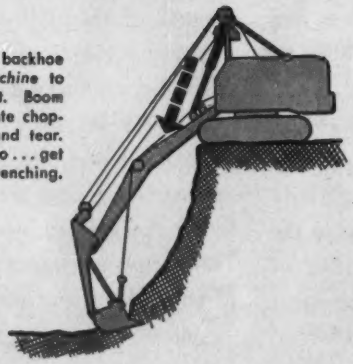
"No matter how deep we're digging, and even in tough shale and rock, the boom stays down and we get a heaped dipper every pass. This . . . helps increase our production at least 30% and sometimes greater."

(Names on request)

No other backhoe — bar none — can match the output of an AMERICAN POSITIVE-PRESSURE backhoe in rock, shale, frost . . . or in easy dirt. For all its advantages, the POSITIVE-PRESSURE system is remarkably simple and trouble-free. No pumps, no powered mechanisms of any kind. Fully automatic. It's the biggest advance in backhoe design in years. And it's an AMERICAN exclusive. Available on any AMERICAN backhoe, new or in the field, ½ to 4½ yards. *You* should know more about it.

B-726

WITH AMERICAN'S POSITIVE-PRESSURE backhoe you utilize almost *entire weight of machine* to penetrate hardpan, shale or deep frost. Boom can't ride up during inhaul. You eliminate chopping . . . reduce caving . . . save wear and tear. You increase output in easy materials too . . . get bonus yardage . . . *especially* on deep trenching.



AMERICAN

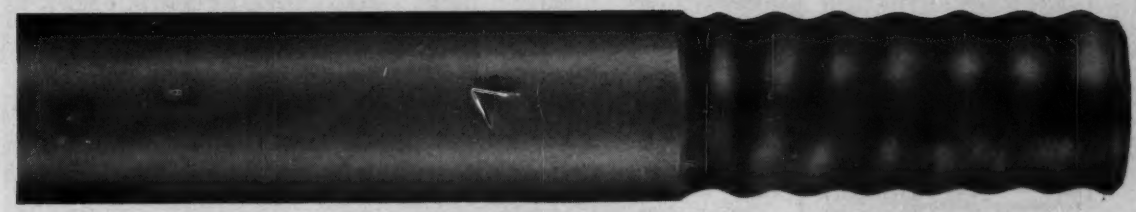
AMERICAN HOIST and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

SHOVELS, EXCAVATORS ½ TO 4½ YDS
CRANES 12½ TO 110 TONS
HOISTS, DERRICKS TO ANY REQUIREMENT

◀ *Circle 47 on Reader Service Card*

▲ *Circle 48 on Reader Service Card*

Coromant Steel with a SMOOTH PROFILE ...the combination that cuts drilling costs!



A perfectly-balanced drilling team— Coromant "Rope Thread" steel and bits with Atlas Copco rock drills ... and Copco compressors.

Smooth profile Sandvik Coromant "Rope Thread" steel is designed that way for a reason—with a pitch of just two turns to the inch to assure easy uncoupling. Where saw-tooth threads fail, smooth profile Coromant "Rope Thread" allows no starting point for fractures. Combine this with Coromant's cold-rolling, shot peening and SR anti-corrosion processes—and you get fewer broken rod ends and couplings. Consistent high quality, steel after steel, that assures less down time...lower cost per foot drilled. *Then,* when most steels are thrown away, you re-thread Coromant (without heat treatment) and put it back to work! Available in all popular sizes: 1", 1¼", 1½" and 2".

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Circle 49 on Reader Service Card

HIGHWAY BID PRICE TRENDS — New and Old Series

Bureau of Public Roads revised average unit prices and index

Year & Quarter	Excavation, Common ¢/cy	Surfacing: Port. Cem. Concrete $/sy	Surfacing: Bituminous Concrete $/Ton	Structures: Reinforcing Steel ¢/lb	Structures: Structural Steel ¢/lb	Structures: Structural Concrete $/cy	Highway Bid Price Index 1957-59 =100
Old Series*							
1922...	40	2.28	...	5.0	7.4	20.18	63.2
1929...	32	2.05	...	4.8	5.9	21.58	55.0
1932...	18	1.44	...	3.4	4.6	15.33	36.4
1940...	21	1.68	...	4.5	6.3	19.17	42.8
1943...	44	2.71	...	6.7	9.5	30.19	74.6
1945...	36	2.38	...	6.2	7.7	31.62	65.1
1948...	42	3.37	...	10.8	15.8	51.00	90.3
1950...	33	3.32	...	10.0	13.9	44.62	82.3
New Series*							
1950...	32	3.62	5.89	9.9	12.9	42.62	78.3
1952...	43	4.19	6.98	11.9	17.8	52.24	98.9
1955...	35	3.96	6.07	11.0	15.7	50.01	87.3
1956...	40	4.26	6.58	12.7	21.2	53.74	98.8
1957...	42	4.34	6.75	13.4	22.8	55.98	103.1
1958...	43	4.41	6.67	12.9	18.6	54.10	100.6
1959...	40	4.40	6.58	12.6	16.9	53.00	96.4
1960 Avg.	39	4.33	6.37	11.9	16.7	51.72	94.1
Q1...	37	4.36	6.11	12.5	17.8	53.98	93.0
Q2...	38	4.35	6.20	12.1	15.5	50.20	91.9
Q3...	42	4.27	6.71	11.4	16.7	50.97	96.5
Q4...	41	4.33	6.44	11.6	16.6	51.71	95.0
1961							
Q1...	41	4.18	6.19	11.5	16.2	52.14	94.4
Q2...	39	4.13	6.38	11.6	16.3	53.25	93.2

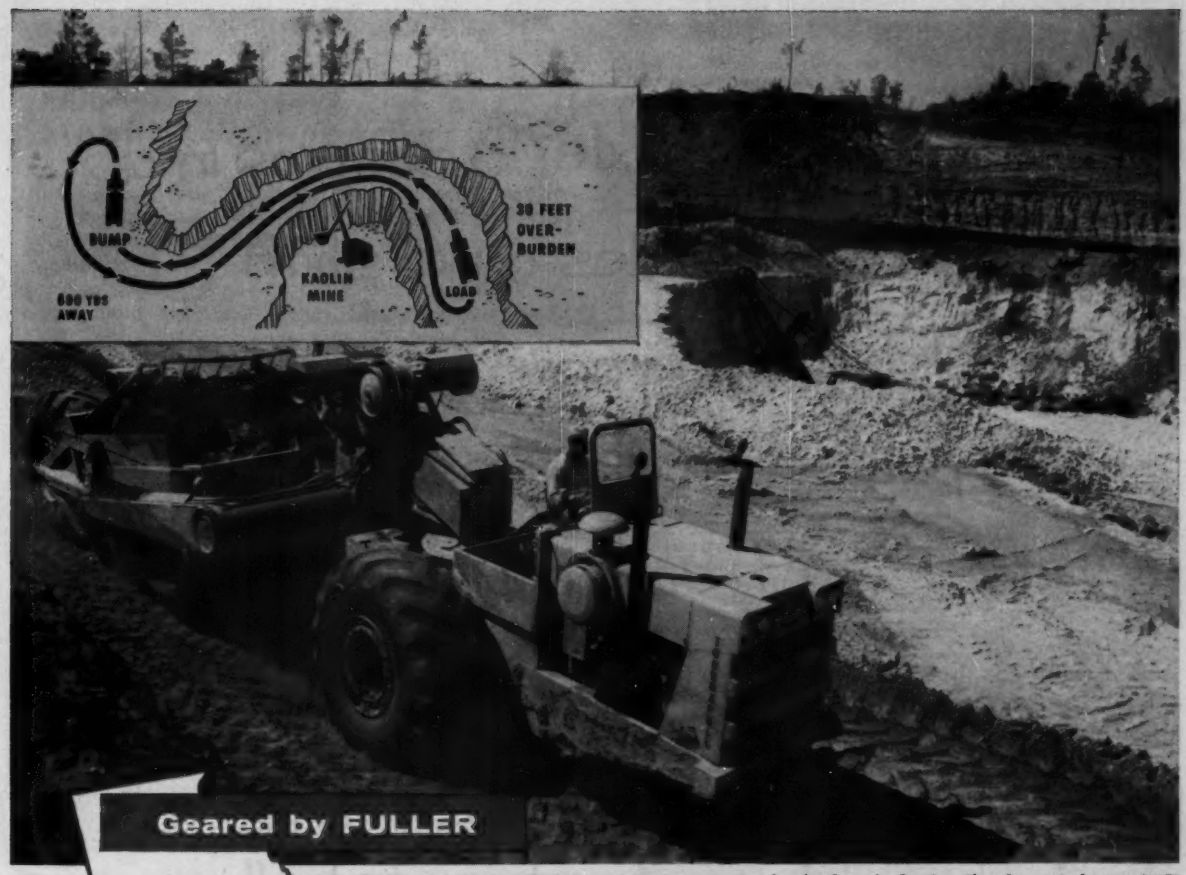
*Old series originally based on 1925-29=100 base converted mathematically to new 1957-59=100 base with no change in quantity weights or bid price averages. New series has new 1957-59 base quantity weights and average bid prices.

VALUES AND WEIGHTS in New Highway Bid Price Index

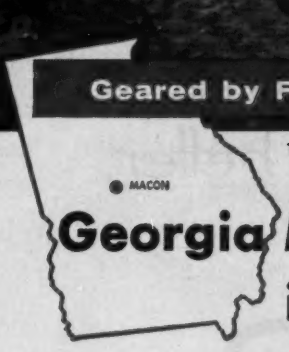
Item	Unit	Quantity (thousand)	Unit Price	Value Dollars (thousand)	Weight %
Excavation	cu yd	3,641,885	$0.42	$1,529,592	33.8
Surfacing:					
Portland cement concrete	sq yd	154,953	4.38	678,221	15.0
Bituminous concrete	ton	111,516	6.66	742,472	16.4
Subtotal, surfaces			...	1,420,693	31.4
Structures:					
Reinforcing steel	lb	2,206,879	0.129	285,139	6.3
Structural steel	lb	2,581,462	0.195	502,294	11.1
Structural concrete	cu yd	14,583	54.18	790,027	17.4
Subtotal, structures		...	...	1,577,460	34.8
TOTAL		...	...	4,527,745	100.0

bounded in the 9 mo covering late 1960 and early '61, they dropped back in the second quarter of this year. Surfacing and structures bid prices have been firming up, but too slowy to offset a softness in excavation bid prices.

The BPR's third-quarter index won't be avaiable until after we go to press. Meanwhile, only one of the dozen or so state highway departments that compute their own quarterly bid price indexes has reported. Idaho's index is up 3% in the third quarter, reflecting a recovery in excavation prices from a drastic cut in the second quarter. Only asphalt and structural steel average bid prices were down in the third quarter in Idaho.



The Model C Tournapulls that cut through overburden for the Georgia Coating Clay Company feature 8V-71 GMC engines, Fuller L-1220 Transmissions and pull 20-yard pans.



Georgia Mining Company uses L-W's in getting down to KAOLIN

To get to the pure white kaolin they mine for the production of china and paper, the Georgia Coating Clay Company of Macon has to strip off anywhere up to ninety feet of overburden.

Two LeTourneau-Westinghouse V-Power Model C Tournapulls are kept on the move throughout the company's area to strip off the overburden of red clay, fuller's earth and gumbo. Used in continuous operation at many mine locations, these machines lay open the rich veins of kaolin so that shovels and trucks can bring out the pure white clay.

Arthur Yates, Shop Foreman for Georgia Coating Clay, is more than satisfied with his new V-Power C-Pulls. "This C with the 290 hp V8 engine outperforms anything we've ever seen. Naturally we specified the Fuller L-1220 Transmission—we've been using Fullers for quite some time, and have nothing but the best to say about them. The L-1220 gives us an even flow of power from the big V8 engine, and we get no vibration. And then the Countershaft Inertia Brake built into the Fuller Transmission provides quick upshifts for constant operation at peak horsepower, while the Pressure Lubrication and Filtration System assures us of full transmission oil flow and keeps the gear lube clean. We like the Fuller; it's a simple, heavy-duty transmission that has given us nothing but the most reliable service."

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

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Circle 51 on Reader Service Card

BPR Says Materials Took 51¢ of '58 Highway Dollar

A SURVEY of highway construction costs during 1958 shows that 51¢ of every dollar went to pay for materials used during construction. Equipment costs amounted to 12¢ and operators who ran the equipment received 10¢ of the highway dollar.

Another 14¢ went for on-site workers other than equipment operators. Taxes, insurance, overhead, and profit shared the remaining 13¢ of the construction dollar.

This breakdown is based on a U.S. Bureau of Public Roads survey of more than 3,300 federal-aid highway jobs underway during a four-week period from July 13 to Aug. 9, 1958. The results of the survey have just been released by BPR.

Truck drivers, who took home 2.5¢ of every dollar, were the single biggest labor expense.

On the projects surveyed by BPR, man-hour requirements amounted to 94 hr of on-site labor and 125 hr of off-site labor per $1,000 of highway construction.

For off-site labor, 70 man-hr of "primary" labor were needed for the final stages of manufacturing materials, equipment, and supplies, for mining or quarrying materials, and for distributing and servicing these items. Another 55-man-hr for each $1,000 worth of highway construction were needed for the earlier stages of manufacturing, distribution, servicing, and other off-site operations.

Where the Highway Dollar Goes

Based on BPR survey of federal-aid projects in mid-1958

Total Construction Costs		**$100.0**
Equipment		**12.0**
	%	
On-Site Wages, Total	**100.00**	**23.9**
Equipment Operators for	41.02	
Trucks	10.50	
Tractors	10.42	
Cranes and shovels	5.09	
Motor graders	5.04	
Scrapers	4.80	
Rollers	1.78	
Concrete mixers, pavers	0.67	
Bituminous plants, pavers	0.54	
Concrete and asphalt finishers	0.61	
Rock crushers, gravel plants	0.50	
Piledrivers	0.49	
Off-highway haulers	0.27	
Subgraders and spreaders	0.17	
Other trades	0.12	
Apprentices	0.02	
Other skills	46.44	
Unskilled		
Professional and managerial	11.54	
Clerical	0.80	
Service	0.20	
Materials, total		**50.6**
Steel, total		12.2
Structural		5.6
Reinforcing		3.9
Culvert pipe		0.9
Miscellaneous		1.8
Petroleum products, total		10.7
Premixed bituminous paving mat'l		4.5
Fuels, lubricating oils		3.5
Bitumens		2.7
Cement and Concrete, total		10.5
Cement		4.9
Ready-mixed concrete		4.1
Culvert pipe		1.5
Aggregate, purchased only		7.1
Lumber, timber piling		1.1
Explosives		0.5
Other materials		8.5
Other		**13.5**

SOME BIG CONTRACT AWARDS OF THE MONTH

Guy F. Atkinson Co., South San Francisco, Calif. Section of Seattle Freeway, King County, Wash. Washington State Highway Commission, Olympia. $7,944,493.

George F. Driscoll Co., New York. Big Six Towers; five 18-story, one 17-story, and one 15-story apartments, Woodside, N.Y. New York Typographical Union No. 6, New York. $16,624,000.

Blount Bros. Construction Co., Montgomery, Ala. Saturn rocket complex, Cape Canaveral, Fla. Corps of Engineers, Jacksonville, Fla. $15,190,000.

Jackson Bros., Los Angeles, Calif. Airport marina, Westchester, Calif. Fritz B. Burns and Associates, Los Angeles. Estimated cost: $5 million.

John H. Eisele Co., Inc., New York. Mt. St. Mary's convent and training center, Newburgh, N.Y. Archdiocesan Building Commission, New York. Estimated cost: $3,875,000.

Allegheny Contracting Co., Pittsburgh, Pa. Roadwork and seven bridges, Jefferson County. Pennsylvania State Highway Dept., Harrisburg. $5,213,798.

Bethlehem Steel Co., Bethlehem, Pa. Superstructure, Newburgh-Beacon Bridge over Hudson River. New York State Dept. of Public Works, Albany. $8,397,963.

Aetna Bridge Co., Providence, R.I. Highway and bridges, International Rt 95, Providence. State of Rhode Island and Providence Plants, Division Purchases, Providence. $4,686,335.

Kenny Construction Co., Skokie, Ill. Grading, draining on Interstate route, Louisville-Catlettsburg, Ky. Commonwealth of Kentucky Dept. of Highways, Frankfort. $4,848,953.

J. H. Pomeroy and Co., San Francisco, Calif. DeSabla Powerhouse, Butte County, Calif. Pacific Gas and Electric Co., San Francisco. $3.5 million.

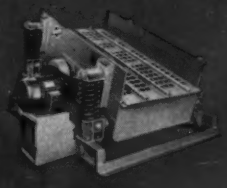
United Engineers & Constructors, Inc., Philadelphia, Pa. Electric furnace and auxiliary buildings at steel plant, Coatesville, Pa. Lukens Steel Co., Coatesville. $6,250,000.

Badger Mfg. Co., Cambridge, Mass. Phthalic anhydride plant, Perth Amboy, N. J. California Oil Co., Eastern Div., San Francisco, Calif. Estimated cost: $5 million.

Poirier and McLane Corp., New York. One-mile section of Interstate Rt 80, Lodi, N.J. New Jersey State Highway Dept., Trenton. $3,503,802.

Foley Construction Co., Cincinnati, Ohio. Roadwork and bridges, Rt 25, Hamilton County. Ohio State Dept. of Highways, Columbus. $5,742,226.

Panama, Inc., Houston, Tex. 61-mi natural gas pipeline from West Monroe to Jena, La. United Gas Pipeline Co., Houston. $3,975,000.



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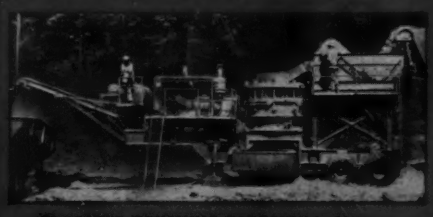
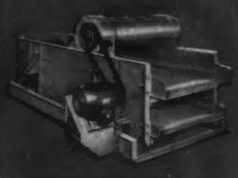
sound aggregate for sound construction

EFFICIENT EQUIPMENT

Efficiency in aggregate equipment is its ability to earn a profit *consistently* for you! Telsmith *builds it in.* That's the *why* of Telsmith's low upkeep, high capacity *and* lowest cost per ton crushed, in producing specification aggregate.





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Modern engineering . . . over 50 years of experience in making aggregate machinery . . . advanced design and construction . . . finest factory facilities. One machine or a complete plant—Telsmith is your best buy for reliability and profits.

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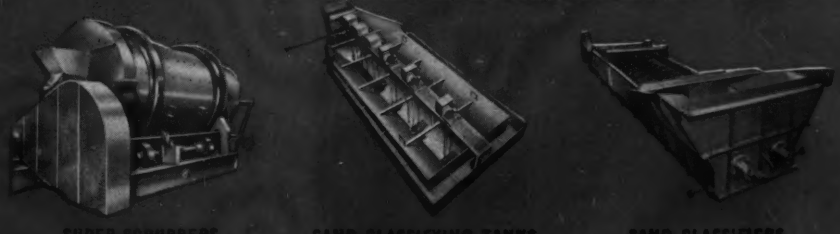

E-21

SMITH ENGINEERING WORKS / DIVISION OF Barber-Greene

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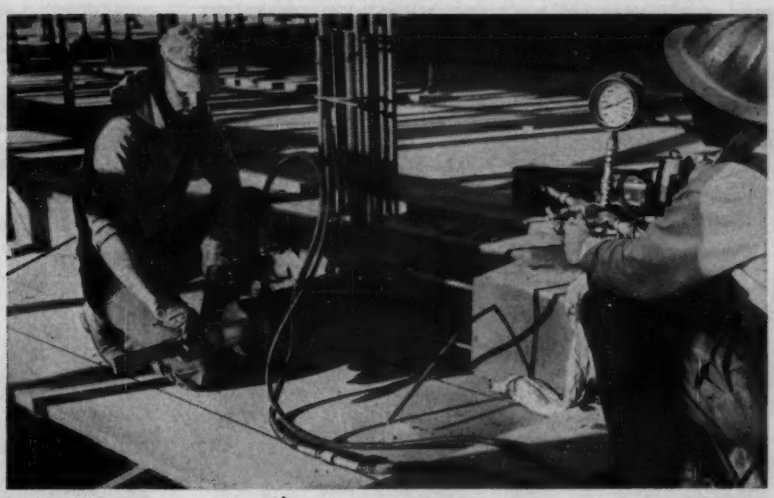
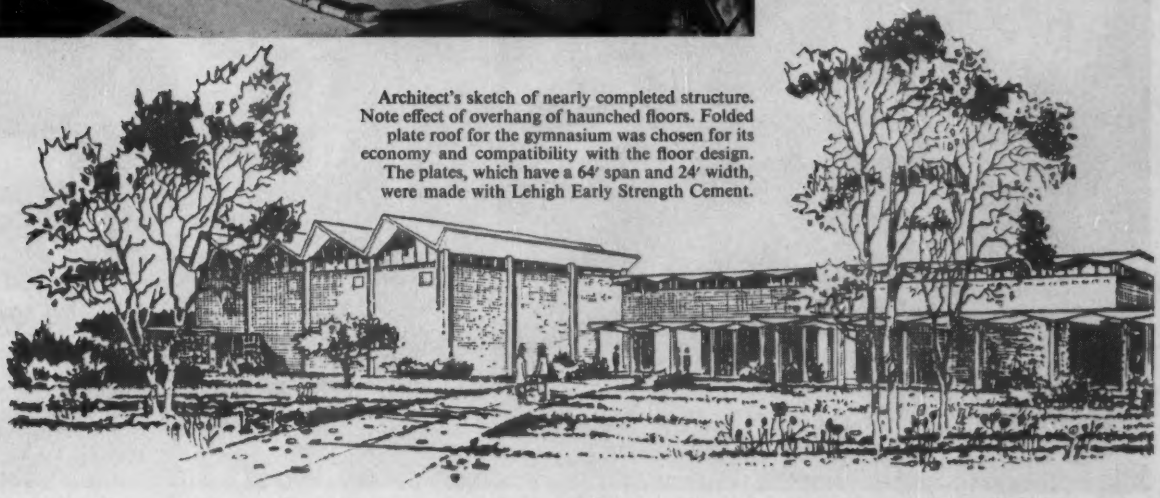
Circle 56 on Reader Service Card

Post-Tensioned Concrete Floors for new school



Floors were poured in sections. As concrete in each section reached 3500 psi, post-tensioning was applied. Thickness of floors varied from 6″ to 12″.



Architect's sketch of nearly completed structure. Note effect of overhang of haunched floors. Folded plate roof for the gymnasium was chosen for its economy and compatibility with the floor design. The plates, which have a 64′ span and 24′ width, were made with Lehigh Early Strength Cement.

• For both economy and looks, an ingenious floor and roof design was created for Colby, Kansas' new Junior High School. Lightweight post-tensioned haunched slabs made possible a savings in material costs and provided great flexibility in the allocation of floor area. A folded plate roof for the gymnasium adds to the fresh overall appearance of the finished job.

Lehigh Early Strength Cement speeds winter construction. To meet the fast winter construction schedule, the use of early strength cement in the slabs was, in the contractor's words, "The only answer consistent with economy." With Lehigh Early Strength Cement, the slabs reached tensioning strength in one half the usual time, keeping the job on schedule with multiple use of a single set of forms. In addition, the reduced curing time meant savings on *winter* protection costs.

This job is another example of how modern concrete construction and Lehigh Early Strength Cement offer almost unlimited opportunities for design freedom, construction economy and attractive appearance. Lehigh Portland Cement Company, Allentown, Pa.

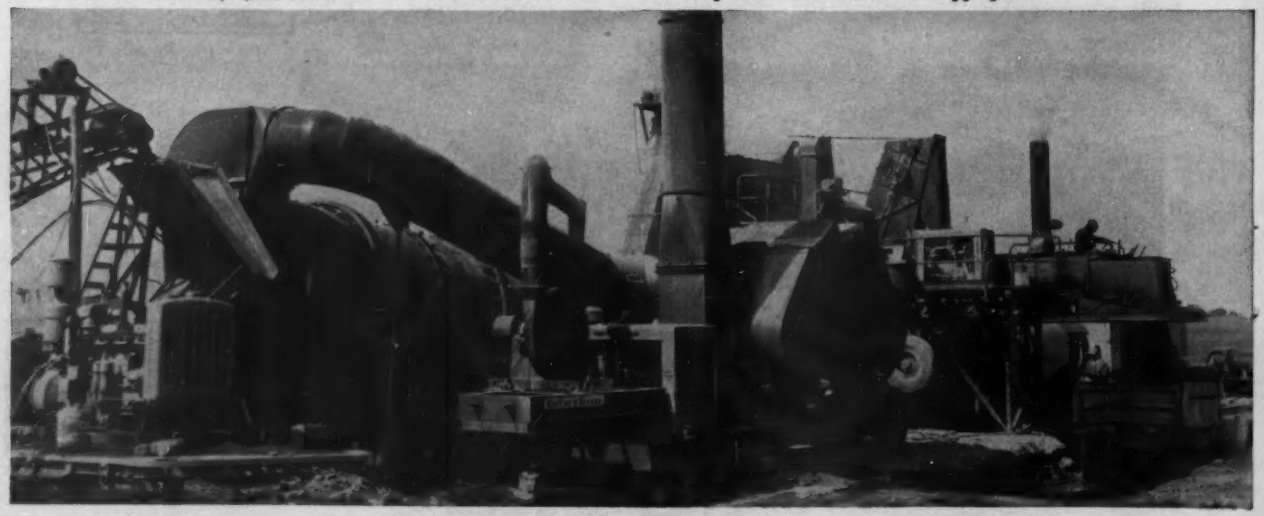
Architect: Mann and Company, Hutchinson, Kansas
Contractor: L. R. Foy Construction Co., Hutchinson, Kansas

LEHIGH CEMENTS

Concrete for first and second floor and roof was made with a lightweight aggregate and Lehigh Early Strength Cement. The haunched design added to the overall architectural effect as well as contributed to the saving of materials. Lehigh Mortar Cement was used for all masonry.

STEADY PERFORMER. Lee & Johnson's new SA-40 averaged better than 200 tph for first 11 weeks operation with no downtime. Machine features joystick power-assist steering, hydraulically self-dumping hopper, heavy-duty longer life screed with improved automatic leveling and twin screed heaters, automatic feeder control, oscillating push rollers for on-the-fly pick up of trucks, and perimeter access for fastest, easiest servicing.

PROFITABLE PAVING PACKAGE. Lee & Johnson's Barber-Greene paving package is rounded out by this big 848-A Continuous Mix plant consisting of an 868 gradation unit, DA-70-CA-70 Dryerpac, and four-bin 817 cold feeder. Plant was torn down in 10 hours and was back producing two days after making first move. Plant Foreman Gerald Tenney states: "With this new Dryerpac we meet any high production requirement regardless of moisture in the aggregate."



EVERYTHING A-OK AS NEW SA-40 PAVES 90,000 TONS OF MIX IN JUST 11 WEEKS

"Our new Barber-Greene gives us high capacity performance with operating ease, precision control and is a cinch to maintain," says Lee & Johnson superintendent

Lee & Johnson, Inc., Sioux City, Ia., asphalt paving contractors, wasted no time getting the low down on their new Barber-Greene SA-40 Finisher.

Superintendent Roy Hankins puts it this way: "We just hit the starter and turned her loose on three state and county jobs totalling 41 miles. In 11 weeks our SA-40 has put down over 90,000 tons of mix, consistently averaged over 200 tph, more than 2,000 tons per day with one peak of 2,738 tons. She was working under speed restrictions, too, most of the time since speed on state work is limited to 45 fpm. And we know this baby can pave at 100 fpm because she made seven haul trucks disappear like magic one day when we went out to beat an oncoming rain storm.

"Furthermore," adds Supt. Hankins, "The SA-40 easily pushed the largest trucks up the 7% grades on these jobs and smoothly paved the curves. And the machine's automatic leveling ability meant we easily satisfied the ⅛" in 10' state surface deviation requirement.

"When we bought our new 200 tph Barber-Greene 848-A plant," he concludes, "We wondered if the SA-40 could keep pace. It has and it could easily handle even more mix. It's easy to operate, gives precise control, and that perimeter servicing makes it the simplest and fastest finisher to maintain. It's the ideal machine for our high-capacity paving operations."

Let your Barber Greene Distributor show you why the SA-40 has become the nation's best selling finisher in its first season. You'll like the price, too, for it includes features you pay hundreds of dollars extra for on other finishers.

STABILIZATION PLANTS FOR EVERY NEED. Self-erecting Model 828 shown produces stabilized base mix from 200 to over 600 tph.

World's No. 1 Manufacturer of Asphalt Paving Equipment

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Ex Uno Plura

(out of one, many)

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Pioneered in the thirties—and proven by over 90 million horsepower—it concentrates all GM Diesel's resources on the perfection of a *single basic cylinder design for all engines.*

What does this unique *family concept* mean to you?

It means you can meet every power need, from 20 to 1008 h.p., by using engines of just 2 different cylinder sizes—with up to 70% *interchangeability of parts* between engines in each series.

It means *lower parts costs*—up to 50% less than for Diesels built in a flock of different designs and cylinder sizes. Lowest servicing costs, too.

It means you can *meet growing horsepower needs* (without loss of existing parts inventory or maintenance know-how) merely by stepping up to the next engine in the series.

It means that all the advances of the past, present and future can be applied to *every* GM Diesel—whether it's in equipment you've had for 20 years, or one that's just off the line.

It means *the ultimate in standardization benefits,* with greater profits per engine on every GM engine you add.

No wonder so many equipment buyers specify GM Diesel power. Ask for it in your next piece of equipment.

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GM DIESEL

SERIES 53 & 71 ENGINES

One proven design throughout the line builds greater value into every engine

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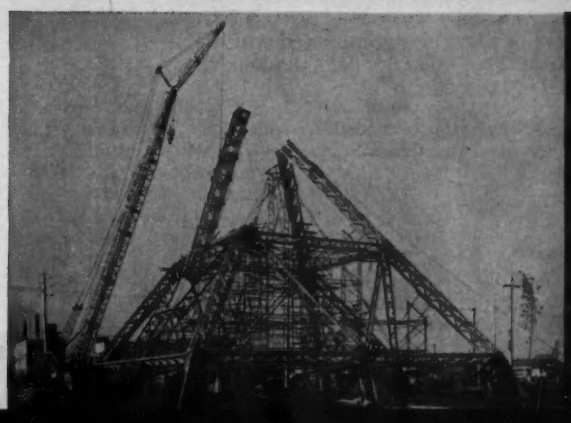
CONSTRUCTION METHODS

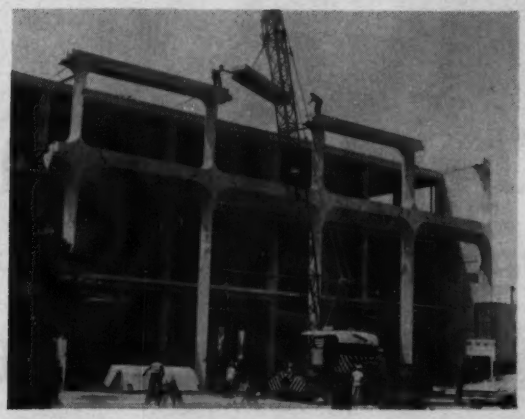
PICTURE OF THE MONTH



Kaleidoscopic Construction

• Thirty-nine tons of aluminum prefabricated into Tinker Toy-like segments went into this display pavilion at Japan's International Trade Fair in Tokyo. Each of the four sides of the pyramid was geometrically divided into four parts that were placed by a P&H truck crane and bolted together. Every piece of the structure is aluminum, except for zinc-plated bolts that were used to join the segments.

Construction News in Pictures...



Japanese Jigsaw Puzzle

Like putting together pieces of a jigsaw puzzle, workmen connect notched precast concrete members to form the facade of a Japanese-owned department store in Los Angeles. Subcontractor Wailes Precast Concrete Co. made the 60-ft-high columns and connecting segments in Sunland, Calif., and trucked them to the site as needed. They are secured by welding steel inserts cast into the concrete. William Simpson Construction Co. of Los Angeles is general contractor.

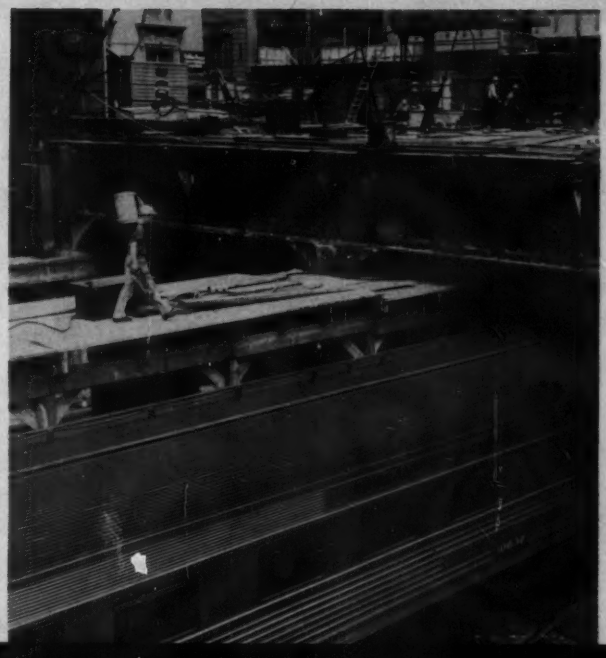
Rapid Moving

A Ko-Cal Roughloader loads approximately 20,000 yd per day on a dam project on the south fork of the Tolt River in Washington. The $7-million dam will provide water for nearby Seattle. Joint contractors for the project, started in 1959 and scheduled for 1963 completion, are Anderson Construction and Wilder Construction Co.

As Trains Go By

To construct a 30-story office building over railroad tracks near Grand Central Station in New York, Bethlehem Steel Co. erected a steel "island" on girders threaded between two levels of tracks. The columns for the building will rise from the steel substructure. Contractors on the project are Diesel Construction Co. and Rose Associates.

continued on page 68




HALLIBURTON
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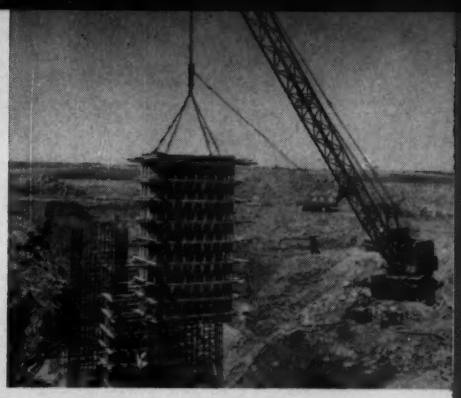
J-27244

Mobil® Construction Project Study...

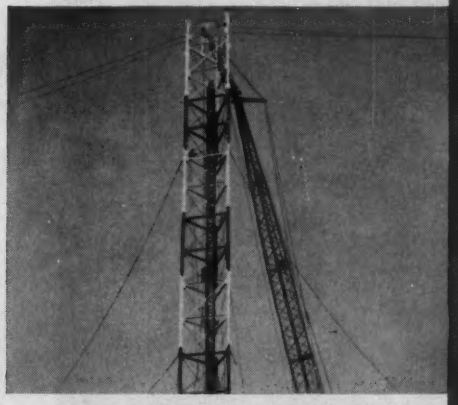
2,700-acre site was cleared of timber and 12 miles of road were built by the Navy, starting early in 1958. Continental Electronics was named prime contractor for all radio transmitting construction and electronic equipment. Photo above shows five of the 26 antenna towers and two of the many guy foundations. *Below left:* 405,000-pound rolling weights on special towers balance the pull of high winds and ice on antennas through 4-reeve blocks. Weights roll on guides curved to increase pull as antennas are deflected. In the event that the antennas become overloaded with ice, the entire system will lower itself to the ground.

Weights consist of steel drums filled with 300,000 pounds of high density concrete (270 lbs./cu. ft.) controlled to within 1,000 pounds—an unusual specification in concrete pouring. Helix house is shown in background. *Below right:* Early construction for helix house, partially erected. Helix acts as an extension of antenna, tuning it to proper transmission frequency. External structural members permit smooth aluminum surface inside. Houses were designed by Continental Electronics.

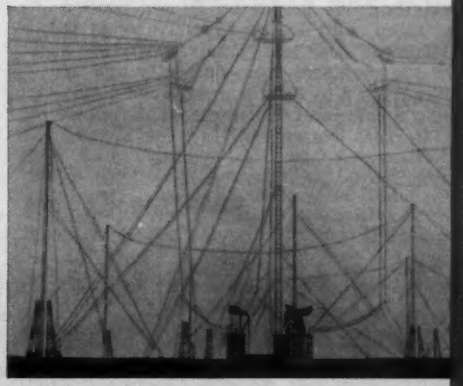
Knowing how one contractor meets the demands of time, efficiency and profit may help you in your next job.



Lowering form over steel reinforcements prior to pouring concrete foundation. 90,000 cubic yards of concrete and 15,000 tons of reinforcing steel were used. About 1,300 people were employed during construction. 2,500,000 cubic yards of earth were moved. 2,200 miles of grounding cable were imbedded 12″ in the earth.



Raising gin pole through center of tower after using crane to maximum height. Supported by the towers, gin poles were used up to 1,000 feet. There were no fatal accidents. Tower mid-sections are heavier to resist horizontal antenna pull-off load. Peripheral towers had outward camber so as to assume vertical position under antenna load.



Inner circle of one array. In each array there is a center tower 979.5 feet high surrounded by an inner ring of six 875-foot towers and an outer ring of six towers 799 feet high. Ice can be melted from antennas by 4,000,000-watt electrical heating. Either of the two antenna arrays can be heated while the other transmits.

How Continental Electronics builds giant U.S. Navy radio station despite 40-mile winds and −25° F. cold

26 giant towers, ranging up to 979.5 feet high, mark the site of the recently completed U.S. Navy Very Low Frequency Radio Station at Cutler, Maine—largest and most powerful Navy radio installation for surface fleet and submarine communication. Total project cost $68.5 million. Continental Electronics Manufacturing Company was prime contractor for $47 million. Transmitting capacity is 2,000,000 watts. The two antenna arrays of thirteen towers each cover an area greater than 11 Pentagon buildings. Other installations include an operations building, helix houses and a power plant to handle electrical requirements.

Navy clearance of the site was started in the spring of 1958 after which Continental Electronics Manufacturing Company was brought in as prime contractor. The Navy Bureau of Yards and Docks was the contracting agency for the Bureau of Ships. Construction was pushed to completion one year ahead of schedule. No seasonal weather concessions were made. Tower and guy foundations were poured at temperatures as low as −25° F. using heated concrete, protected while setting. Tower construction was carried on even in gale winds. Severe weather increased the difficulties of operating mechanical equipment.

Mobil on-site co-operation was used to aid in organizing lubrication and preventive maintenance. This included check sheets and other control records, lubricating truck design, inventory control and engineering service. Mobilgas, Mobilfuel Diesel, Delvac, Mobilgrease, and Mobilube were the principal Mobil products supplied to both Continental and its subcontractors.

What you can expect from Mobil on your job

Your skill is in construction. Mobil backs you with its skill in guarding the life and efficiency of costly mechanical equipment. You get this for the asking, right on the job—a complete program to help you cut costs, increase the availability and life of equipment and promote safety. Mobil brings you the benefits of: (1) skilled engineering service, (2) quality products, (3) close relationship with equipment builders, (4) lubricant and application analysis and (5) convenient location of its bulk plants for prompt delivery. For further information about how we can help you in these five important areas, write to us.

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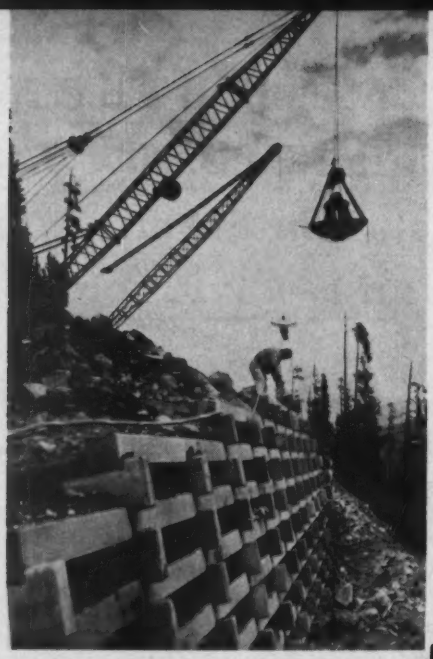


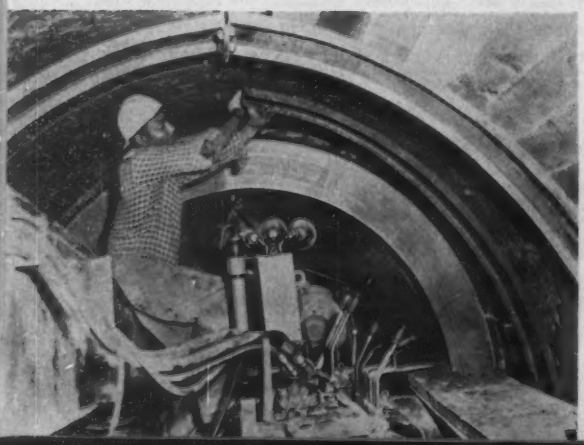
CONSTRUCTION NEWS
IN PICTURES . . . *continued from page 65*

High Widening in Rockies

A 40-ft-high wall of reinforced concrete cribbing is being placed in the Colorado Rockies to shore up 1,680 ft of new highway across the Continental Divide. At Berthoud Pass, U.S. 40 is being widened and straightened with the help of 8-ft-long, 8-in.-sq concrete logs manufactured by American-Marietta Co. at Welby, Colo. Hubner Construction Co. uses a Little Giant (below, left) to place the logs in interlocking position below existing roadway. Koehring truck crane fills cribs with rock and earth to form new subgrade.

Heavy Rock Reinforcing

Huge dolomite rocks, weighing 183 lb per cu ft, are spotted with a Manitowoc crane fitted with 25-ton-capacity tongs to reinforce two jetties in Humboldt Bay near Eureka, Calif. The rocks are blasted from a quarry 22 mi from one jetty and 40 mi from the other. Chunks from 6 to 25 tons are hauled singly in dump trucks and placed by joint contractors Morrison-Knudsen Co., Inc., and Mercer, Fraser Co., Inc., of Eureka.



Tunnel Ribbing

Workmen are placing 12-in.-wide steel ribs at 4-ft intervals along 8 mi of storm tunnel being constructed beneath the South Chicago Expressway. The ribs are placed directly behind boring operations. Lags placed between the ribs prevent collapse while a concrete floor is poured. Steel reinforcing is then installed along roof and walls. Concrete is pumped from the surface to a movable steel form. The ribs were made by Jones & Laughlin. The diameter of the tunnel ranges from 10 to 24 ft.

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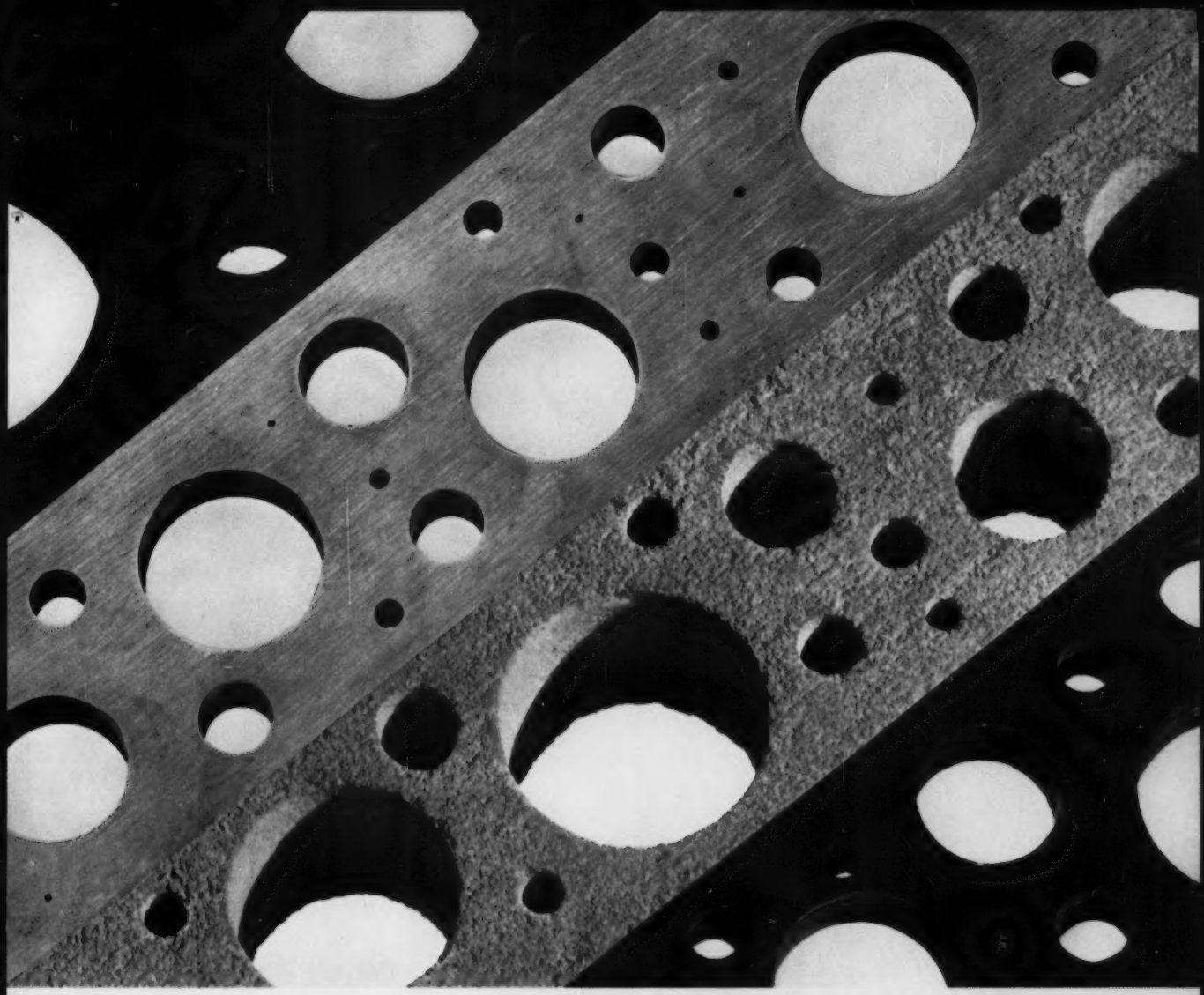


There's a Black & Decker Drill for every hole on this page

And now for every Black & Decker Drill (all 58 of them), there's 20-25% longer life, extra drill power, handier handling. These built-in bonuses attest best to the tool engineering and design that never follows, always leads. ⇨ ⇨ ⇨

New Motor Varnish—insulates motor wire for running-temperatures up to 38% higher, increases overload capacity as much, and adds to motor life.

Advanced Commutator Lead Fusing gives better bonding at higher temperatures. New carbon brushes get 50% longer life, cut commutator wear.

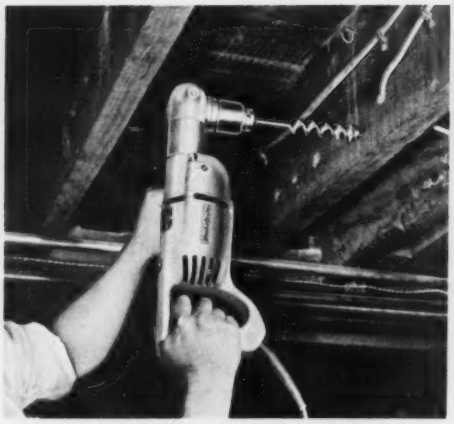
Improved Cooling System uses new-design fans, larger ventilating holes to make every Black & Decker Drill the coolest handling tool for the job.

More Power Per Pound in every B&D Drill helps you get through your work quicker and cleaner. Contour handles afford the easiest grip, too.

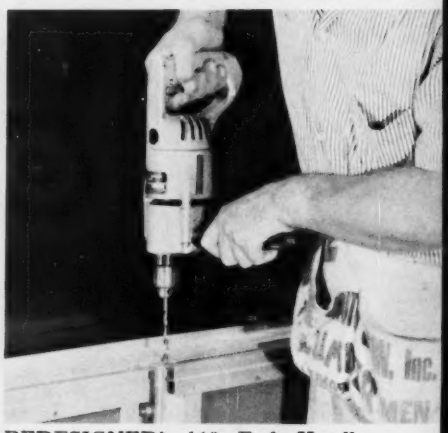
BLACK & DECKER'S LONGER LIFE LINE

58 B&D Drills get through the work faster, easier . . . have more drill power to last longer

NEW! ½" End Handle Drill is ideal for tough construction jobs. So powerful it has 48 ft./lbs. lock torque, the highest of any comparable tools.

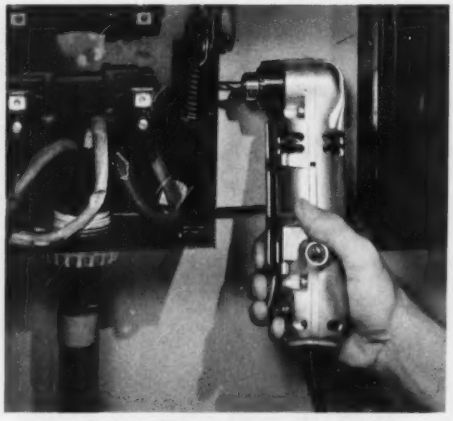


NEW! ½" Right Angle Drill has a head for getting around corners, between joints and pipes. Reverse end attachment to speed up or slow down.

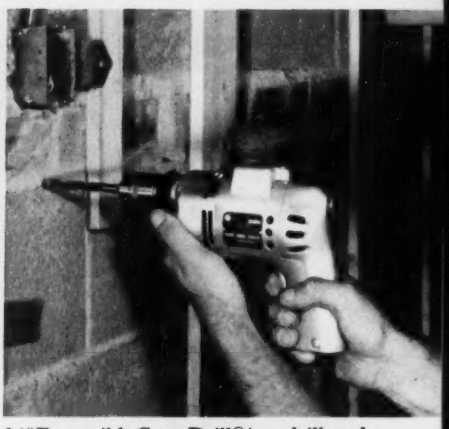


REDESIGNED! ¼" End Handle Drill has a slimmer, more compact profile, ball-bearing construction. Features long-life, cooler-running motor.

Magnetic Drill Press in ¾" and ¼" sizes, sticks to the job in any position. 2-speed 1¼" also available. All models reverse. Manual or remote control.



¼" Shorty Drill is a compact little helper that works in and out of the tightest quarters with special ease. Twin fans make this a cool tool, too.



⅜" Reversible Scru-Drill® is a drill and screwdriver in one. Drives or removes screws, nuts and bolts; drills ⅜" capacity in steel, ¾" capacity in wood.

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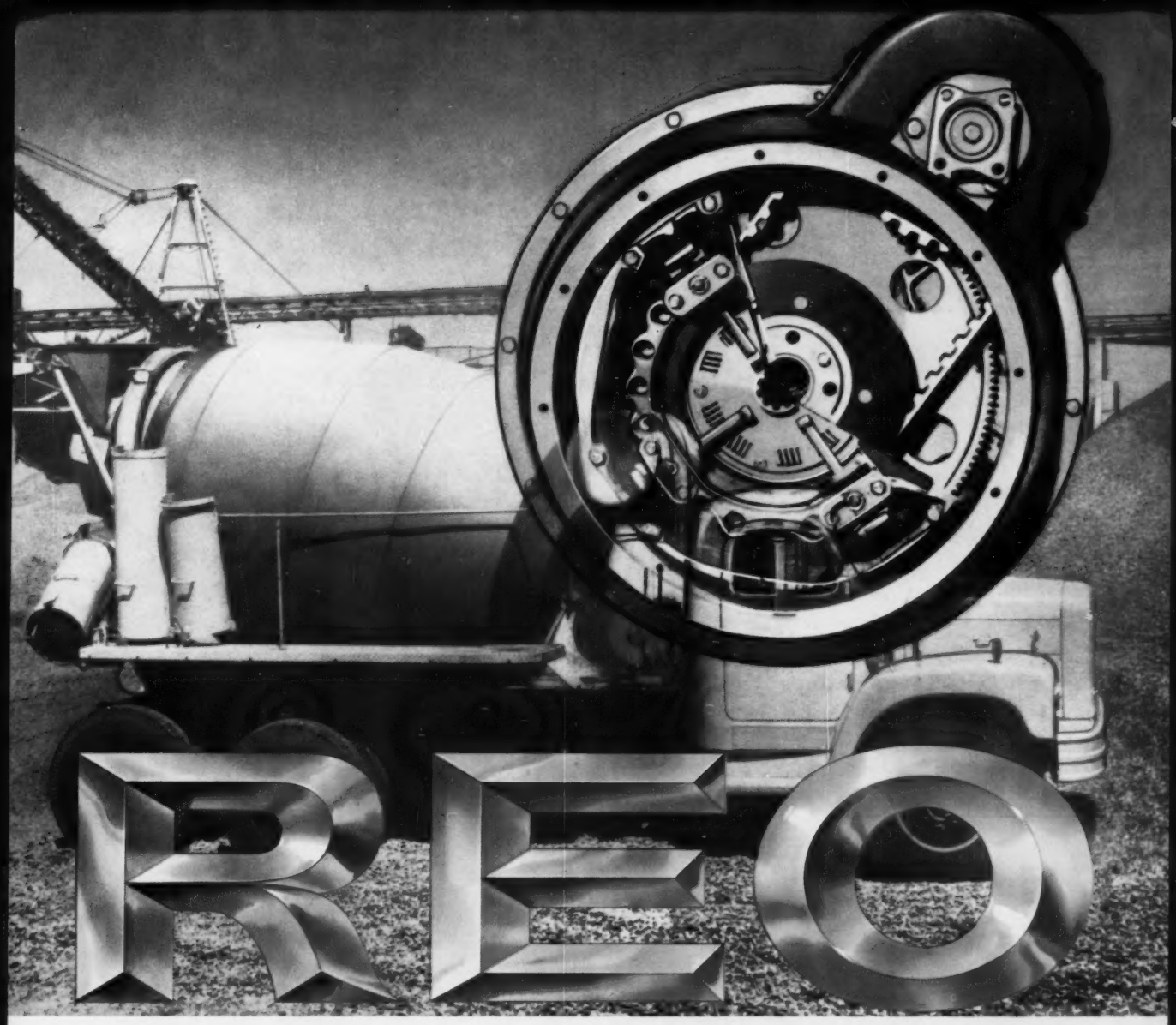
Every bit counts . . . when you go through construction jobs with any one of Black & Decker's 58 drills. Power? B&D's newly beefed-up motors won't back down in the toughest going. Handling? When you grip a B&D Drill naturally, it's never off-balance, always easy to handle. Durability? Black & Decker Drills lead a rugged life — and love it! Sold at leading distributors everywhere. *For sales or service, look in the Yellow Pages of your telephone book under* TOOLS ELECTRIC



PAYLOAD PROVEN... FLYWHEEL POWER TAKE-OFF

- **MARTIN BLOCK CORPORATION** "Most satisfactory even under extra heavy loads and tough operating conditions. We carry payloads more economically and we do not have the expense of a separate mixer engine." *Ray Chambers, Sr., Supervisor of Fleet Maintenance.*
- **READY MIX CONCRETE COMPANY** "We are more than pleased with our Reos equipped with Flywheel Power Take-Off. We save an additional 450 pounds in weight over our conventional equipment." *Lawrence Ross, Superintendent.*
- **MARSHALL SAND & GRAVEL COMPANY** "Very good results on our two Reo C-432s with Flywheel P-T-O. No maintenance costs so far after nine months of operation. Our Reos save us 1000 pounds in weight over our former equipment." *Robert Marshall, Partner.*

CONCRETE HAULAGE, INC. "In 11 months of service . . . no maintenance cost on Flywheel Power Take-Off of our three Reo C-442 models. The P-T-O is a very satisfactory way of operating transit mixers." *R. C. Martin, Manager.*

Gold Standard of Values

REO MOTOR TRUCK DIVISION · THE WHITE MOTOR CO. · LANSING 20, MICH.

DIESELS:

Shell reveals how a special additive in Shell Dieseline can help you cut downtime and maintenance costs

Shell Dieseline® contains a remarkable additive called FOA-5X®. This additive was developed by Shell Research specially to help keep fuel line filters clean, and prevent injector corrosion.

Read how Dieseline with FOA-5X can help you cut downtime and maintenance costs—and get top engine performance.

SHELL Dieseline contains a special additive called FOA-5X®. Here are three important moneysaving jobs FOA-5X does for your diesel fuel systems.

1. FOA-5X helps keep Shell Dieseline clean and free of sediment, even during prolonged storage.

2. FOA-5X can help reduce diesel engine downtime by helping fuel filters and injectors to remain unclogged and clear. It inhibits sediment formation and helps keep tiny contaminants finely divided so they flow freely through screens and nozzles.

3. FOA-5X helps prevent corrosion and rust.

Maximum economy

The uniformity of Shell Dieseline enables injector nozzles to work efficiently. And it lets your mechanics tune an engine's fuel injection system for maximum economy.

The viscosity of all Dieseline is controlled to help provide proper lubrication of pumps and injectors.

Minimum knock, fast starting

The ignition quality, measured by cetane number, is tailored to your engine requirements. Results: controlled combustion, minimum diesel knock and good starting characteristics.

Shell Dieseline can help produce maximum engine power. And can make a significant difference in your diesel equipment. That difference is *top engine performance.*

Shell Dieseline is available in grades to meet all engine requirements. Ask your Shell representative to specify the correct grade for your equipment.

Grades for all engines

Shell Dieseline is available coast to coast in grades to meet all engine requirements.

How to learn more about Dieseline

For additional information on Shell Dieseline, contact your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A Bulletin from Shell
—where 1997 scientists are working to provide better products for industry

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▲ *Circle 72 on Reader Service Card*

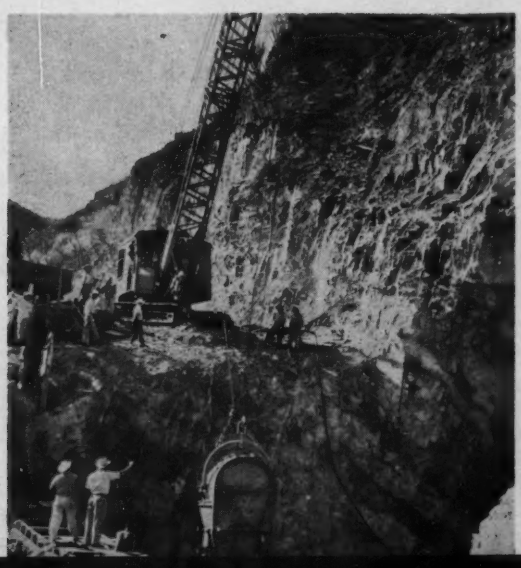
Construction 'Round the World...

In Puerto Rico

In San Juan, 3,100 yd of concrete was poured in a continuous 30-hr operation for the tower mat foundation of the Puerto Rico Sheraton Hotel. Working through a 12-hr tropical rainstorm, concrete subcontractors Rovira & Llado used six cranes and 26 7-yd transit mixers to place the mat in a 20-ft-deep excavation. Some 430 tons of reinforcing steel was used. General contractor is J. R. Nieves Co.

In France

The bridge over the Durance River, Basses - Alpes Department, was opened to traffic 18 months before the scheduled completion of the Escale Dam and hydroelectric project. The French contractor used precast, prestressed concrete for the bridge's nine spans, placed at the rate of one every three weeks. The 138-ft-high earthfill dam and powerhouse will produce 675 million kwh of electricity annually.



In Mexico

For an underground hydroelectric plant on the border of Michoacan and Guerrero, eight million yd of excavation was required to hew 17 tunnels out of solid rock. A Manitowoc Model 2000 crane pours concrete at the mouth of one of the shafts, some of which are as large as 50 ft in dia. Cofferdams are now under construction so that work can continue during the wet season. Contractor Ingenieros Civiles Asociados has provided housing for 1300 families relocated at the site.

NEW EXPLOSIVES FOR QUARRY AND OPEN-PIT BLASTING

Flo-gel (pronounced FLOW-GEL) and Flo-gel HD are non-nitroglycerin gelatin type explosives that provide high loading densities where concentrated loads are needed.

Some of the advantages of using Flo-gel and Flo-gel HD are:

1. More energy per foot of bore hole with higher loading densities.
2. Increased energy (as much as 20%) may permit greater spacings and burden.
3. Improved fragmentation because of high rate of detonation coupled with increased energy.
4. Wet holes may be preloaded.

FLO-GEL AND FLO-GEL HD

contain no nitroglycerin • are nonheadache producing • are insensitive to blasting caps • will not detonate from rifle bullet impact • will not propagate from hole to hole • will not drain off in rock fractures • provide high loading densities • possess excellent water resistance

Ask your Hercules representative for details on how Flo-gel and Flo-gel HD can save you money in your blasting operations.

Explosives Department, Hercules Tower, 910 Market Street, Wilmington 99, Delaware

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Construction Methods AND EQUIPMENT

NOVEMBER, 1961

VOLUME 43 • NUMBER 11

HENRY T. PEREZ, Editor

Machines...and Men

THE CONSTRUCTION INDUSTRY scored two important breakthroughs in equipment technology last month; ultrasonic waves were harnessed to drive piles with phenomenal speed, and electronics was put to work to control automatically the screeds of bituminous pavers.

Each of these developments has much significance, both for the contractor and for the buyer of his services. And each has its roots in areas far from the construction world; the sonic pile driver had its origin in a dental drill, and the electronic control is the outgrowth of a device to enable guns of army tanks to remain "on target" while speeding over rough ground.

The new sonic rig (*p. 82*) produces sound waves that are inaudible to the human ear. With them, it can drive piles in one-twentieth the time it takes with a conventional hammer. And the machine's pile-extraction performance is similarly fast.

The electronically controlled bituminous paver (*p. 84*) automatically compensates for subgrade irregularities. Because it reacts almost instantaneously, far more quickly than a human operator can make adjustments, it produces a smoother surface. The machine makes a better road at faster speeds, and there is no reason why its electronic controls cannot be adapted readily to guide slipform concrete pavers.

These exciting new developments are only two of the many that will continue to advance the art and science of construction. But while the construction industry focuses its attention on machines, it is losing sight of one prime fact—machines do not operate without men. And while the contracting field will need more skilled men in the coming years to do the jobs required of it, it is not developing those men.

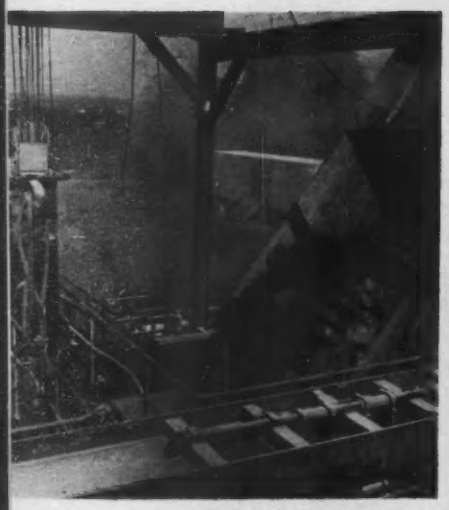
The manpower outlook in the construction industry is alarming (*p. 132*). By 1970, an additional 2,300,000 skilled workers will be needed to meet normal attrition and a bigger market. At the present rate of training, only 10% of these craftsmen will have learned their trade in formal apprenticeship training programs.

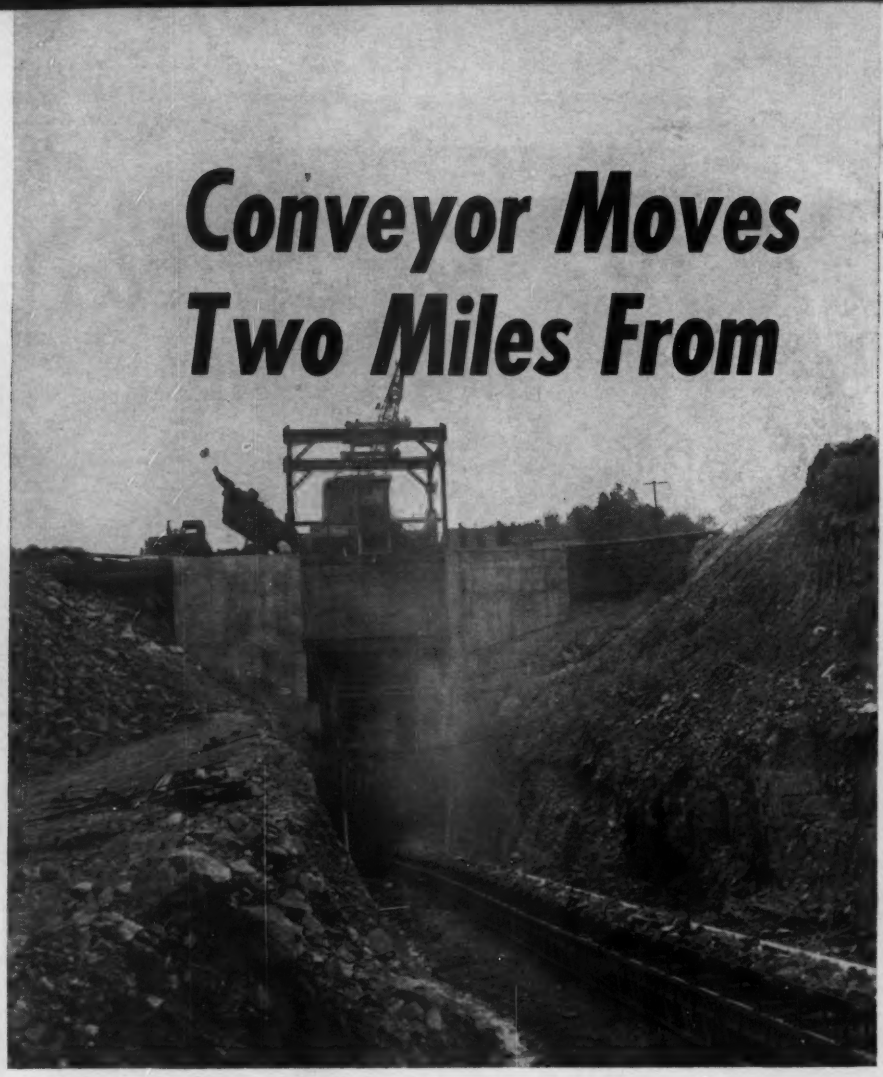
Right now, apprentices in many key trades are below 1950 levels. The total of all apprentices in the construction field has been declining since 1956. And the rate of drop-outs is rising.

The reasons for this sorry state of affairs are many. One is that today's youths seem to prefer white-collar jobs to working with their hands. Another is that partially trained apprentices are able to move out and command journeyman wages in labor-short areas. But their contractor-employers are paying high rates for sub-standard work.

Unions blame the contractors for the apprenticeship problem. Contractors blame the unions. But instead of each pointing the finger, both sides should join hands to remedy the situation. Unions and contractors working together through joint apprenticeship committees can develop the skilled men this industry needs. Unless they do, both will be in trouble.

Conveyor Moves Two Miles From





CRUSHER FEEDS CONVEYOR— Trucks dump shot rock into hopper of 54-in. gyratory crusher set up within short haul of rock cut. Crusher reduces rock to −8 in. Belt feeder loads crushed rock onto first flight of cross-country conveyor for 2-mi trip to the fill.

By WILLIAM MOONEY
Assistant Editor

A 2-MI-LONG CONVEYOR is moving a mountain at the New Jersey end of the George Washington Bridge. Rock is crushed at the cut and carried by the conveyor to a man-made lake that is being filled in to make way for a huge interchange.

The conveyor will move 3,750,000 tons of crushed rock before the job is completed next year. Totaling 10,900 ft in length and made up of 10 separate flights, it runs along the right-of-way of Interstate 95 from a crusher at the rock cut to the rock fill. The conveyor, which can handle as much as 2,000 tons of material per hr, represents an investment of $1.5 million.

Why a conveyor instead of trucks? Contractor George M. Brewster & Son Co. made the choice after a careful study of job conditions.

It would take a fleet of about 70 trucks to haul material from the cut at one end of the job to the fill at the other end. Much of the haul route would have run along local streets in a densely populated area. Remainder of the haul route would have crossed a hydraulically placed sand blanket near the fill area. Both portions of the haul road would have been rough on trucks.

So the contractor ruled out truck haulage as against his own and the public interest. Brewster found that a conveyor would require about the same initial investment as a truck fleet. But the salvage value of the conveyor would most likely be greater at the end of the job. And the conveyor offered the profit-making advantage of continuous operation with few operators.

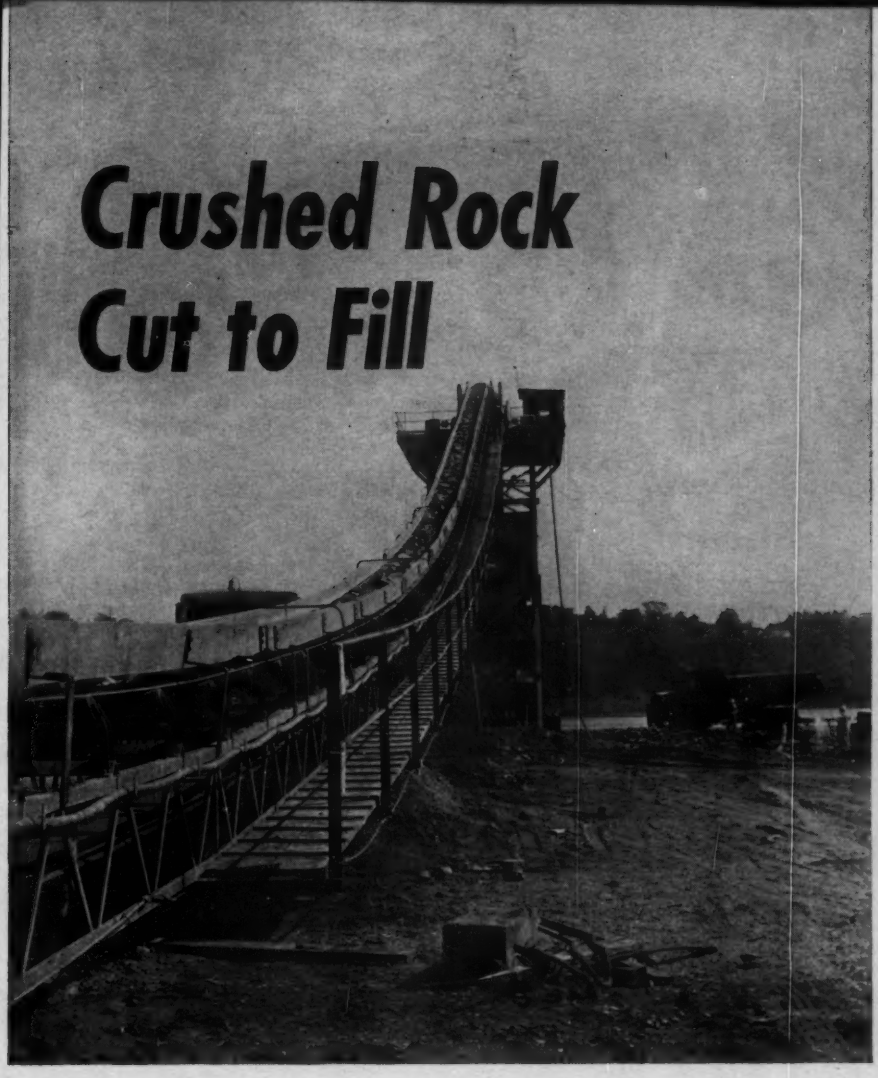
The rock cut is split in two by heavily traveled Route 4, which follows a draw through a rock ridge from which Brewster must cut out 2,500,000 yd of earth and rock. The contractor is working two faces—one on each side of the highway. Most of the material is rock that requires blasting.

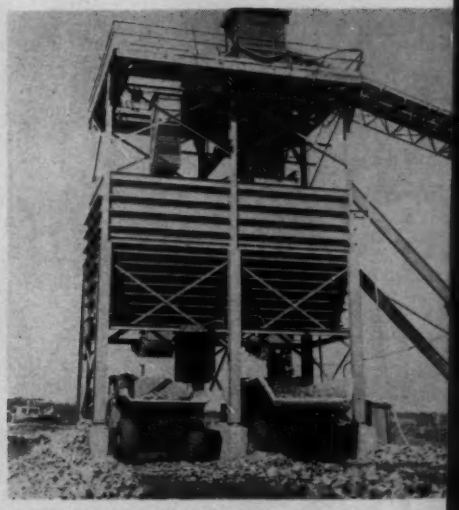
A team of Ingersoll-Rand and Gardner-Denver crawler-mounted drills works atop each rock face while shovels load rear dumps at the bottom. The drills bore holes the full depth of the cut, which ranges up to 90 ft. Spacing of the holes averages 8 ft; Brewster reduced spacing from 9 ft to obtain better breakage.

Semi-gel and straight-gel dynamite plus ammonium nitrate is used as explosive. Bits are 2½-in. Atlas Copco Coromant with tungsten carbide tips. Drill steel is 1½-in. Atlas Copco rounds in 10-ft changes.

A centrally located compressor station supplies

Crushed Rock Cut to Fill





CONVEYOR FEEDS BINS—At end of 2-mi run the conveyor loads twin truck bins. Its 42-in. belt moves as much as 2,000 tph at a speed of 610 fpm. Drive motors total 1,550 hp. Bins load a fleet of trucks that dump rock in lake that is being filled in to make way for interchange.

air for the drills. Four skid-mounted Ingersoll-Rand XLE-2 compressors are set up inside a 40x60-ft prefab steel building. Powered by a 350-hp diesel engine, each compressor delivers 1,888 cfm at 125 psi. Fully automatic Westinghouse starting panels control each unit.

The compressors feed a 2-mi-long, 8-in.-dia steel header that runs the full length of each cut. Aluminum pipes branch from the header and feed air to the drills through rubber hoses.

The contractor estimates that the compressor station replaces a bank of about 12 portable compressors. The distribution system saves time by eliminating moves.

At each rock cut, a 5-yd Bucyrus-Erie 120-B electric shovel teams up with a 3-yd Bucyrus-Erie 54-B to load a fleet of Euclid and Mack rear dumps with shot rock. At the top of one cut, a third Bucyrus-Erie 54-B and a 2-yd Lorain backhoe remove overburden. Working two 7-hr shifts, Brewster is loading out about 10,000 yd per day.

Haul distance to the crusher that feeds the conveyor is short. Maximum distance from the cut is 3,000 ft. Brewster has detoured Route 4 over a temporary bridge so that trucks can cross beneath the highway to reach the crusher.

continued on next page

ROCK FILLS LAKE—Trucks build ramps into man-made lake to facilitate dumping. Rock will replace unsuitable material removed by dredges to depths as great as 35 ft.

BRIDGE SPANS OVERPASS—Conveyor follows contour of rough-graded right-of-way except at overpasses, where heavy bridge galleries span a railroad and two highways.

TRANSFER BINS ARE MODIFIED—Contractor extended bins at transfer points and added steel rails to make a platform that cushions fall of rock and prevents jamming.

A 54-in. Allis-Chalmers gyratory crusher reduces the shot rock to –8 in. The crusher is dug into the top of a hill below the rock cut to provide gravity feed to the conveyor. Trucks dump rock into the crusher from two sides. A ramp at the front provides access to a third loading station, where earth is separated by a grizzly.

Atop a steel frame above the concrete hopper of the crusher is a Manning, Maxwell & Moore overhead crane that loosens rock jammed in the crusher opening. A crane equipped with a grapple also stands by to help clear the crusher.

The crusher feeds a 50-ft-long, 60-in.-wide conveyor that acts as a large belt feeder for the first flight of the cross-country conveyor. The nine flights of this conveyor range in length from 500 to 2,000 ft. Belt size is a uniform 42 in.; belt speed is 610 fpm. The system requires a total of 1,550 hp.

Engineering work for the conveyor application was done by Willis and Paul, Inc., consulting engineers of Branchville, N. J. The Barber-Greene Co. designed and manufactured the conveyors.

The conveyors consist of standard 24-in. heavy duty truss sections. Except for overpasses, the conveyors follow the contour of the right-of-way, which is rough graded. Concrete piers and timber bents support the conveyors at 50-ft intervals. Heavy bridge galleries span intersections at two highways and a railroad.

The conveying machinery weighs about 600 tons. The belt alone weighs an additional 25 tons. Hamilton Rubber Mfg. Co. of Trenton, N. J., made the belt to Barber-Greene specifications.

The belt runs on more than 3,600 heavy-duty roller-bearing idlers. Troughing rollers are spaced on 4-ft centers and return rollers on 12-ft centers. All rollers are 5 in. dia with ¾-in. shafts.

Dodge Mfg. Co. supplied pulleys and bearings. Head pulleys are 35 in. dia and tail pulleys are 30 in. dia. All have Taperlock hubs. Gravity-type take-ups maintain belt tension.

Westinghouse Corp. supplied the conveyor drives, which include electric motors and parallel-shaft helical gear reducers. Dodge Flexidyne dry fluid couplings between motors and reducers insure smooth starts.

The entire system is operated from a master control panel at the end of the conveyor, where twin bins feed trucks that place the rock fill. Power is obtained from a substation at the site. This substation relays power to five trailers that contain switching gear and transformers. Line current is reduced from 2,300 v to 440 v. The self-contained trailer units were wired and equipped well in advance to speed installation of the system.

The conveyor changes direction at each of nine transfer points. Transfer bins at these locations were modified by the contractor after preliminary runs to prevent jamming of material. Material dropping from one flight to the next also caused considerable damage to the conveyor belts. Maximum drop at a bridge transfer point is 16 ft.

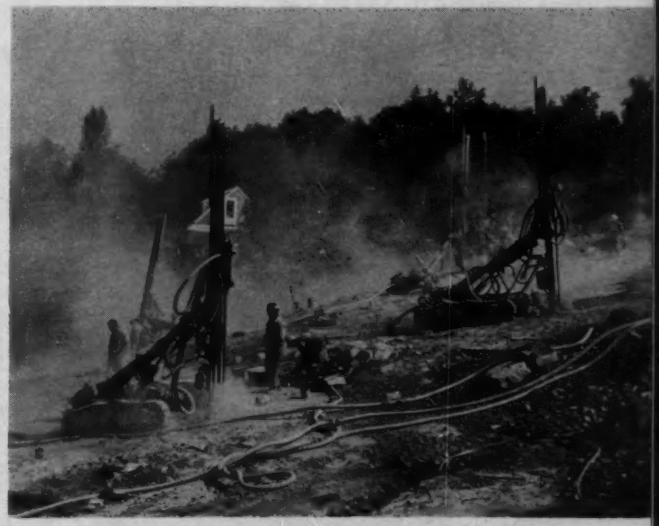
To remedy this situation, the contractor extended the transfer bins about 2 ft and cut holes in the sides of the bins to hold a platform made up of steel rails. Spacing of the rails is about 6 in. Rock

SHOVELS WORK FACE—Shovels load rear dumps with shot rock at one of two faces of cut that will yield 2,500,000 yd. Contractor is loading out 10,000 yd per day.

dropping into the transfer hopper builds up a bed of inert material atop these rails. Subsequently, rock strikes this bed of material before dropping onto the conveyor belt just below, dissipating energy and preventing jamming.

Twin truck bins at the end of the conveyor load a fleet of Euclid rear dumps and Koehring Dumptors. These rigs haul the rock a short distance to the man-made lake at the site of the interchange. The lake was formed by a dredge cutting out unsuitable material. The trucks build a ramp out into the lake to facilitate dumping. Later, rock from the conveyor will be used to build a surcharge atop the sand blanket covering the right-of-way.

Brewster will take two years to complete the $18,000,000 project, which is part of a complex approach system that will feed traffic onto the new lower deck of the George Washington Bridge. Project manager in charge of the job is Earl Hoy. Don Totten is general superintendent and Harold Dietler is project engineer. Resident engineer for the New Jersey State Highway Dept. is Paul Sidlowski.

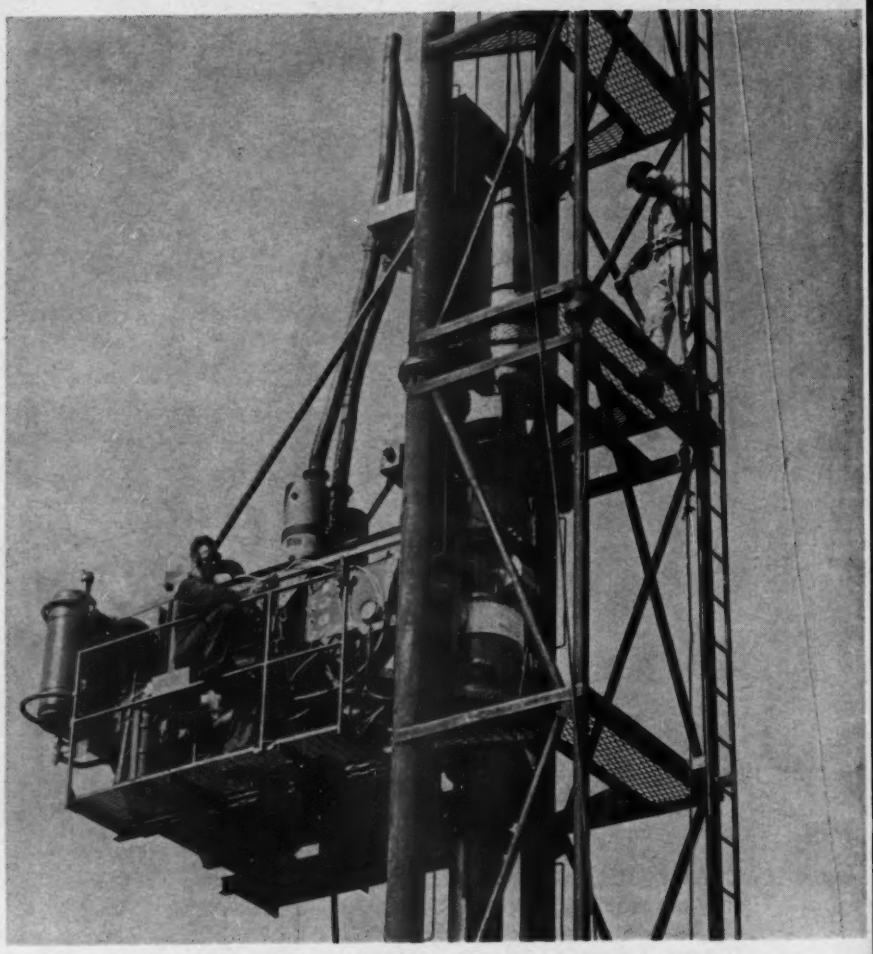


DRILLS ARE ON TOP—Crawler-mounted rigs sink holes the full depth of the cut, which ranges up to 90 ft deep. Four compressors in steel building supply drills with air.

Rig Drives Piles Ultra Fast

A revolutionary new device, producing sound waves that are inaudible to the human ear, can drive piles incredibly fast. The contractor who built it claims that the unit will install a pile in one-twentieth the time an ordinary hammer would take to do the job.

By HENRY T. PEREZ
Editor



INSTALLING PILES by setting up in the member a standing sonic wave pattern is the latest pile driving technique.

How does it work? First look at what it does:

In a test with 60-ft MZ-38 sheeting, for example, it took 50.25 min for a Vulcan No. 1 steam hammer to drive a pile to a depth of 39 ft. Driving was stopped there when it took 290 blows to drive the last 1¼ in.

Then a second MZ-38 sheet was interlocked with the first one. The sonic driver sank it 57 ft in only 1.62 min. When another sheet was interlocked to the opposite edge of the steam-driven pile, the new device took just 1.02 min to put it down 57 ft. And it took only 0.78 min to extract it.

Basically, sonic pile driving involves energizing the pile to its resonant frequency with a mechanical oscillator. Fitted to the pile top, the oscillator sends alternating high-amplitude elastic waves of tension and compression traveling along the length of the pile.

The pile alternately expands and contracts lengthwise a tiny amount, but at an extremely rapid rate. The elongation displaces the soil at the pile tip, and the weight of the pile and its superimposed oscillator forces the member down into the ground.

But there's another factor aiding fast driving. As the pile elongates, its cross-section decreases (Poisson's ratio). Thus the pile shrinks momentarily away from the earth around it, reducing skin friction and facilitating the stroke. Piles driven sonically exhibit the same test-load characteristics as those driven conventionally.

The sonic pile driving process was invented by Albert G. Bodine, Jr., in Southern California. Charlie Guild, head of C. L. Guild Construction Co. of East Providence, R.I., built and is using a prototype sonic driver.

A 500-hp V-8 Ford gasoline engine, unused war surplus originally built for a Sherman tank, powers Guild's driver. It is shafted to a sonic wave generator, or oscillator, whose rotating eccentric weights vibrate the pile at more than 100 cycles per second. The oscillator is cooled with air from a compressor on the pile-driving crane or on the ground

In use, the engine-oscillator unit rides in an 18-ft-high carriage sliding in the leads. The engine of the prototype model cantilevers ahead of the leads, but later ones will have the weight more symetrically placed. Also on the prototype, the carriage carries two 5,000-lb rams from Vulcan No. 1 hammers as an additional load to help the pile settle into the ground.

For driving, the oscillator must be rigidly fastened to the pile top, and Guild has developed clamps that do this rather quickly. The engine of the sonic driver is throttled so the oscillator resonates the pile,

...With Ultrasonic Waves

Powerful Sonic Pile Driver Is a Big, Heavy Unit

Riding in leads on Lima 802 crane (right), apparatus is about 5x8 ft in plan and 8 ft high, weighs 6 tons (left). A 500-hp engine drives a mechanical oscillator whose rotating eccentric weights vibrate the pile at its resonant frequency—something above 100 cycles per second. Above the oscillator, which here is fastened rigidly to the 12¾-in. OD pipe pile it is driving, is 5-ton weight that helps sink pile. Operator rides up and down with driving apparatus, talks to craneman by phone.

and it starts to penetrate the soil. As the pile embeds itself, the frequency of the sonic wave and the force required to generate it vary. But the torque-speed characteristics of the gasoline engine are such that it responds to these changed conditions automatically, without throttle change.

The only sound from the sonic driver is the noise of the engine, plus a slight hum from the oscillator. Ground vibration is negligible and can not be felt more than a foot or so from the pile being driven.

Here are some typical sonic driving performance figures in sandy soil: 12¾-in. OD pipe (flat plate, closed end), 71 ft in 47 sec; 36-in. pipe (½-in. wall, open end), 57 ft in 2.68 min. In medium clay: 12¾-in. closed-end pipe, 71 ft in 3.26 min and extract in 3.18; 14-in. 117-lb BP section, 71 ft in 3.58 min and extract in 3.86.

In one test, Guild pitted the sonic driver against a Vulcan No. 1, driving in identical ground about 20 ft apart. Piles were 12¾-in. closed-end pipe about 75 ft long. The steam-driven pile reached refusal at 67½ ft. Within the time it took to do that, the sonic driver sank its pile to 71 ft, extracted it, swung a few feet away and repeated the drive-extract-swing routine seven more times.

So, Guild's sonic driver shows great promise. While it has yet to be used in a production pile driving job, it may well revolutionize the business.

Electronic Controls on Paver

In Iowa, a bituminous paver with electronic controls enables a roadbuilder to take the human element out of producing a smooth pavement surface. The control system was adapted from those designed for tanks and missiles.

By JOHN SILINSH, Associate Editor

SET IT AND FORGET IT, and electronics does the rest. That's what's happening on an Iowa highway project where a new electronic screed control system on a bituminous paver is taking the guesswork out of producing a smooth road surface.

The control system follows a string line set to proper grade and automatically adjusts the pavement thickness, crown, and grade. All the operator does is start, stop, and steer the machine.

Highway Surfacers Inc. of New Hampton, Iowa, is testing a Cedarapids paver equipped with this screed control system on an 8-mi section of Interstate Route 80 near Iowa City. On the day *Construction Methods* visited the job, the paver placed as much as 700 tons of bituminous materials in one hour and it took three mixing plants and 30 trucks to keep it on the go.

Minneapolis-Honeywell Regulator Co. developed the system by adapting parts from controls it originally designed to enable army tanks to fire on targets while traveling over rough terrain.

Six basic components make up the control system. A command panel, a pendulum, and a grade sensor feed electric signals based on the desired and existing grade and slope into a fourth component, a control box. It actuates two servo-motors that vary the screed attack angle. Here's what the components do:

THE COMMAND PANEL contains dials that permit the operator to select the desired slope and grade. Once they're set, the paver maintains them automatically. Indicators on the command panel show any deviation from the required slope and grade and give the operator a quick visual check on the performance of the control system.

The command panel also has four toggle switches that enable the operator to switch either or both sides of the paver from automatic to manual control. For manual control the operator manipulates two of the switches to actuate the servo-motors that adjust the position of the screed. For some odd jobs a manual override permits use of the hand wheel for adjusting pavement thickness.

Setting the control system is a simple operation of turning the dial knobs to the required slope and grade. Snapping two toggle switches to automatic engages the electronic control, and the operator can forget about it.

THE PENDULUM furnishes the paver with a true horizontal reference. It is fastened to a transverse

beam attached to the screed arms on either side of the paver. The pendulum is a urethane-and-steel cylinder floating in silicon oil that acts as a vibration damper. The artificial horizon is accurate to 0.1% of slope.

THE SENSOR measures the desired grade. It is equipped with a grid that rides a taut string positioned to correspond to the desired surface of the mat. As the paver's crawler tracks move up or down, the grid rotates about its support arm and remains in contact with the string. Rotation of the grid activates selsyn units within the sensor. These actuate ¼-hp, variable-speed, reversible servo-motors that raise or lower the screed arms to maintain the proper pavement thickness.

When laying a course next to a previously laid mat, the sensor can be fitted with a ski-like shoe in place of the grid. The shoe rides on the surface of the adjacent mat and eliminates the string line.

The sensor attachments are designed for protection of the control system in case they hit anything solid. The grid clips onto the sensor and falls off if it hits something. As soon as the grid drops off, special wiring through the paver's electric clutches automatically stops the machine.

The grid attachment exerts a force of less than ¼ oz against the string. This is not enough weight to depress the tightly stretched string any noticeable amount. The string is supported on nails every 50 ft. In spite of the light weight of the grid, it remains in contact with the string in winds up to 40 mph, according to results of wind tunnel tests conducted by the designers of the system.

THE CONTROL BOX is the brains of the system. It receives electric signals from the command panel, pendulum, and sensor and translates this input information into output signals that actuate the paver's screed arms and control the pavement thickness.

Electronic components in the control box are solid-state, epoxy-sealed modules that can be changed or replaced as easily as tubes in a radio.

THE SERVO-MOTORS, which control the screed arms are the only mechanical components in the new control system. The servo-motors drive through a 48-1 gear ratio and actuate a scissors-like linkage on the screed arm. Movement of the screed arm tilts the screed up or down to control the mat thickness.

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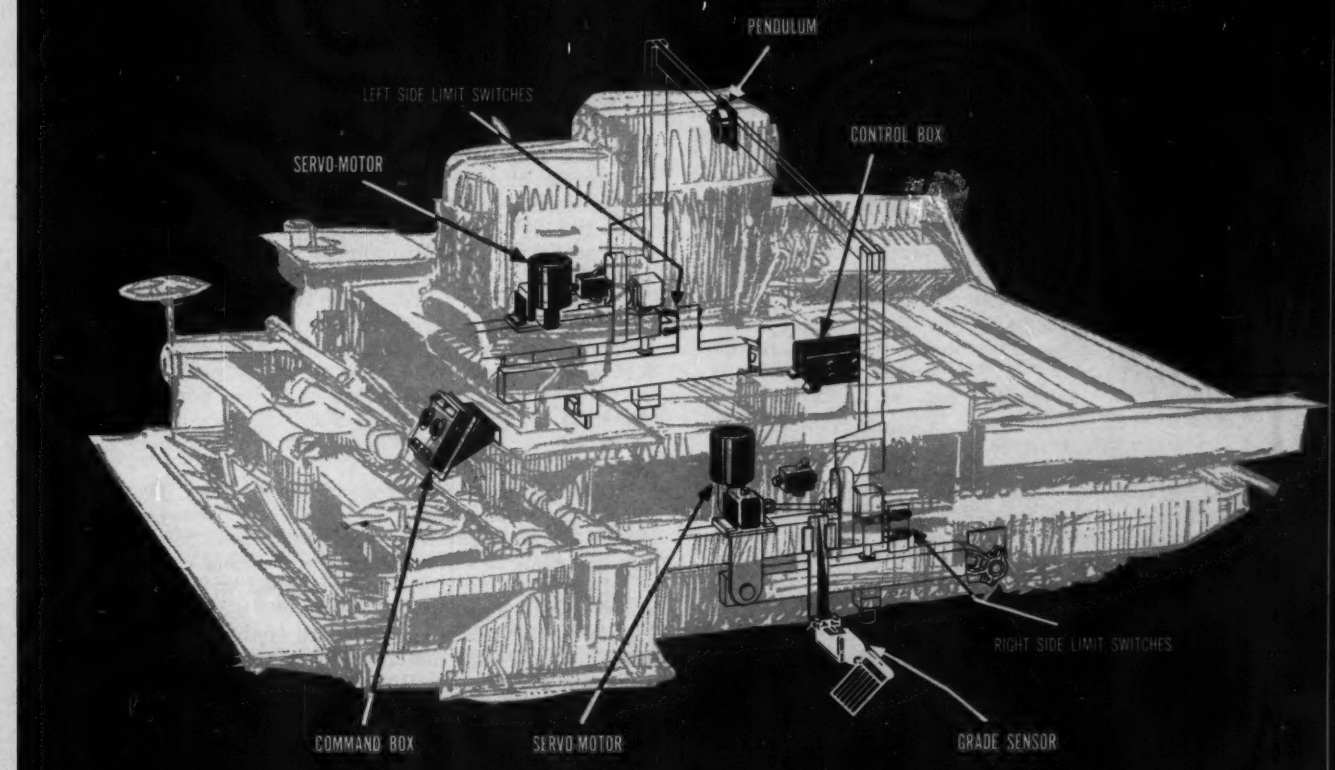
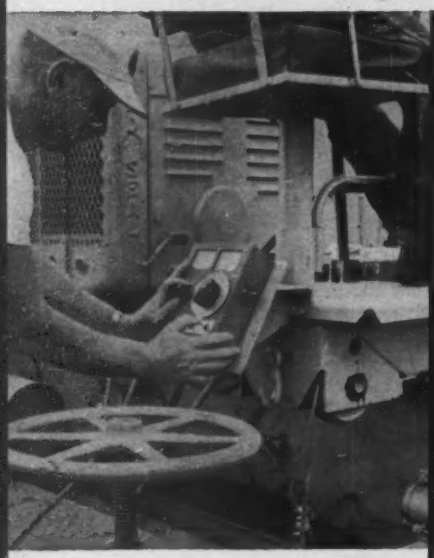
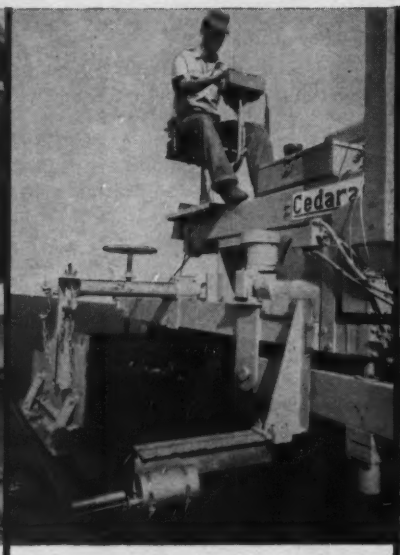
Hold Grade, Crown, and Slope



Set It...and Forget It



PAVER RECEIVES DIRECTIONS – Dials on the command panel select correct slope and grade. Toggle switches engage automatic controls.



THEN FOLLOWS DIRECTIONS – Grid attachment on sensor follows string line and sends electrical signals to control box which adjusts the pavement thickness.

PAVEMENT GUIDES PAVER – Ski-like shoe attached to the sensor in place of the grid follows the surface of a previously laid course and eliminates need for a string.

Adding the scissors linkage on the screed arms is the major modification necessary on the Cedarapids paver to adapt it for use with the electronic controller. New Cedarapids pavers will incorporate the linkage, even if they are not equipped with the new control. Pavers now in use will require substitution of the new linkage for the old screed arm.

Two limit switches on the linkage protect the servo-motors against overloading by limiting the vertical travel of the screed arm supports to 2 in. This is equivalent to a 6-in. vertical movement of the screed itself. Addition of the limit switches prevents the servo-motors from jamming when excessive adjustments in one direction are made.

Before using the new automatic system, the operator positions the screed manually about halfway between the lowest and highest positions. This permits the control system to make automatic adjustments up or down without hitting the limit switches.

In addition to laying a smooth pavement surface, the control system also takes care of superelevation on curves. Superelevation can be handled in two ways: with one string line and dial adjustments for changes in the cross slope; or with a separate string line for each side of the pavement.

The electronic screed controller system is a boon to motorists because it insures a smooth pavement surface. But the new unit offers even greater benefits to the contractor because it eliminates much of the human element in controlling the paver.

Because mat thicknesses are maintained accurately, the contractor is better able to calculate material quantities. This reduces waste and enables the contractor to make more exact cost estimates. And because the new control system eliminates unacceptably bumpy or uneven road surfaces, there's never any need to tear up a stretch of pavement.

Operation is faster, too, with the new control system. Because the system responds faster than a man can react, the paver can lay an acceptable mat while moving at a speed greater than was permissible in the past.

On the Iowa project, Highway Surfacers are setting production records almost every day. The paver has placed as much as 728 tons of material in one hour; paving speeds have reached 100 fpm.

Trying to maintain continuous high production created a few new problems for the contractor. The fast paving speed requires a big batch plant capacity and Highway Surfacers has three portable plants at the job site. The bituminous mix plants are a Pioneer Model 101 and a 102 and a Barber-Greene Model 848.

All three plants are set up in one location. Two receive sand and coarse aggregate by conveyors directly from stockpiles at the site. Trucks deliver the materials to the stockpiles, and dozers charge the belts. The third plant is equipped with four-compartment bins that are charged by a clamshell.

The bins on this plant later will enable the contractor to produce materials for binder and surface courses. These will require four different aggregates. The other two plants produce only asphalt-treated base materials. To keep the paver busy, Highway Surfacers are using all three plants to produce base course material until enough of it has been placed to allow work on the binder and surface courses to begin.

Several Firms Offer Controls

Several equipment manufacturers are working with Minneapolis-Honeywell to adapt the automatic screed controller system to their pavers. Some already have announced availability of this control; others will make it available soon.

Iowa Manufacturing Co. offers the screed controller as an attachment on new Cedarapids pavers and also will sell it in kit form for installation on pavers now in the field.

Blaw-Knox Co. has sold several pavers equipped with this control and may offer it as standard equipment on PF-180 pavers next January. The system is optional on other models. Blaw-Knox pavers with this control have been tested on jobs in Missouri and Oklahoma.

Barber-Greene Co. is testing this control device on their equipment and will offer it on Barber-Greene pavers next January.

Pioneer Engineering also is considering the use of this control on their pavers.

The $2.1-million job requires a total of 400,000 tons of asphaltic materials. These are placed in nine courses to produce the finished 20½-in.-thick pavement. It consists of 16 in. of asphalt-treated base, a 3-in. binder course, and a 1½-in. surface course.

First course in the base is 2 in. thick and contains 5% asphalt. The next four courses are 3 in. thick each and are topped by a 2-in. course, all containing 4% asphalt. Aggregates for the base contain 70% of ¾-in.-max limestone and 30% concrete sand. The binder course is placed in two 1½-in. lifts and the 1½-in. surface course follows.

The asphalt-treated materials are placed on a 6-in.-thick subbase. It is prepared by scarifying the correctly leveled subbase with graders, pulverizing it with a Bros mixer, and compacting it with two sheepsfoot rollers, a Bros 30-ton pneumatic-tired roller, and a tandem steel roller. Disking is used if the materials are too wet for compaction. The subbase is primed before paving.

The first course in the asphalt-treated base is 28 ft 6 in. wide. The finished roadway is 24 ft wide. Highway Surfacers must be careful in paving the first few courses because the paver covers only 14 ft, two passes making 28 ft. Instead of widening the Cedarapids paver to 14 ft 3 in., the contractor found that the extra 3 in. can be covered by carefully rolling the mat and squeezing the hot material sideways.

Rolling equipment on the first lift of the base course consists of a Ferguson 8-12-ton tandem steel roller followed by a Rosco 8-ton pneumatic-tired roller with a tire pressure of 90 psi. For succeeding lifts, another tandem steel roller follows the pneumatic-tired unit.

At present, a fleet of 30 trucks is just about enough to keep up with the paver. But a new problem is cropping up. Because the paver moves at such a fast clip, trucks are emptied in a hurry, and truck spotting causes delays. These are just a matter of seconds, but more than 300 truck loads must be dumped into the paver during a 12-hr-day. A few wasted seconds in spotting each truck easily can add up to a half-hour of lost production.

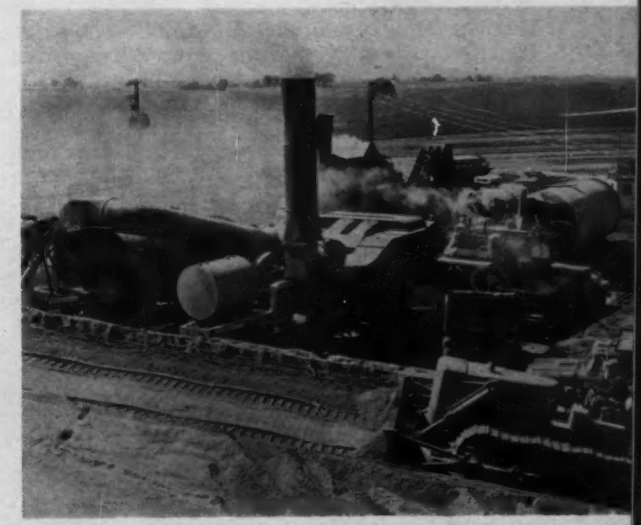
In spite of the few difficulties in producing and supplying materials, Highway Surfacers are making excellent progress and expect to show a good profit on the job. Considering the bid price of only $4.30 per ton of materials, making this job a profitable one is quite an accomplishment. And the contractor gives much of the credit to the electronic controls on the paver.

Another area of savings offered by the new control system is in the size of the paving crew. A normal Highway Surfacers' crew consists of an operator, two men behind the paver for hand shoveling and materials distribution, and one truck dumper. With the new control system only one man is needed behind the paver.

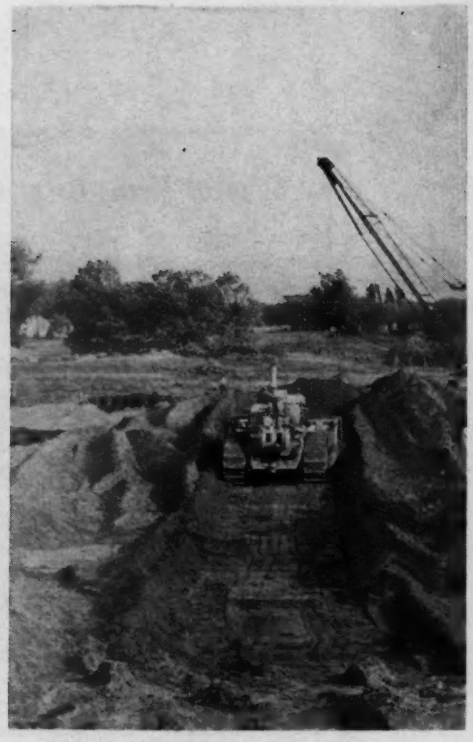
The reduction in the size of the paving crew results, in part, from the paver's ability to make good joints between adjacent courses. With the electronic control, the paver places just enough material at the edge of the course to insure a good joint with very little or no hand finishing.

To date, the best daily production has been 5,200 tons in a 12-hr day. With more experience on the electronic controls, Highway Surfacers expect to place 6,000 tons or even more in one day. From the success they've had in the past, it looks like this goal will be reached before the job is over.

General superintendent for Highway Surfacers Inc. is Mike Emmans. Paving foreman is Paul Hartigan.



SUPPLIES PAVER—This Barber-Greene 848 hot mix plant is one of three bituminous mixing plants that supply the paver. A fleet of 30 trucks delivers the materials to the paver.



◄ **SWAMP DIGGERS**—Draglines excavate peat to make way for road fill. One dragline works along sides of road while another excavates the area in the center.

Two-Stage Work in Swamp

BAD WEATHER won't delay construction on this highway project near Pine City, Minn., in spite of its location in a poorly drained swamp area that becomes impassable after each rainfall. To reduce the effects of bad weather the contractor schedules his earthmoving operations in two phases.

First, he excavates unusable soil in the swamps and replaces it with good fill. Fill is placed only to a height just above the swamp level. This is high enough to give earthmovers a solid footing when the swamp is waterlogged.

When the low-level fill is finished and the entire job site is passable, the contractor completes the cuts and raises the top of the fill to the correct grade. Bad weather has less effect on this phase of work because heavy equipment can travel on the previously placed fill soon after a rainfall.

Johnson Brothers, Highway & Heavy Constructors, Inc., of Minneapolis are the contractors on this 11.7-mi stretch of Interstate route 35. It includes three grade separations and a bridge.

A wide variety of construction equipment handles the earthwork. Draglines excavate the swamps, and scrapers make road cuts and haul fill from borrow pits. Crawler tractors push-load scrapers and level fills, and motor graders and tractor-drawn disks maintain haul roads and aerate wet materials.

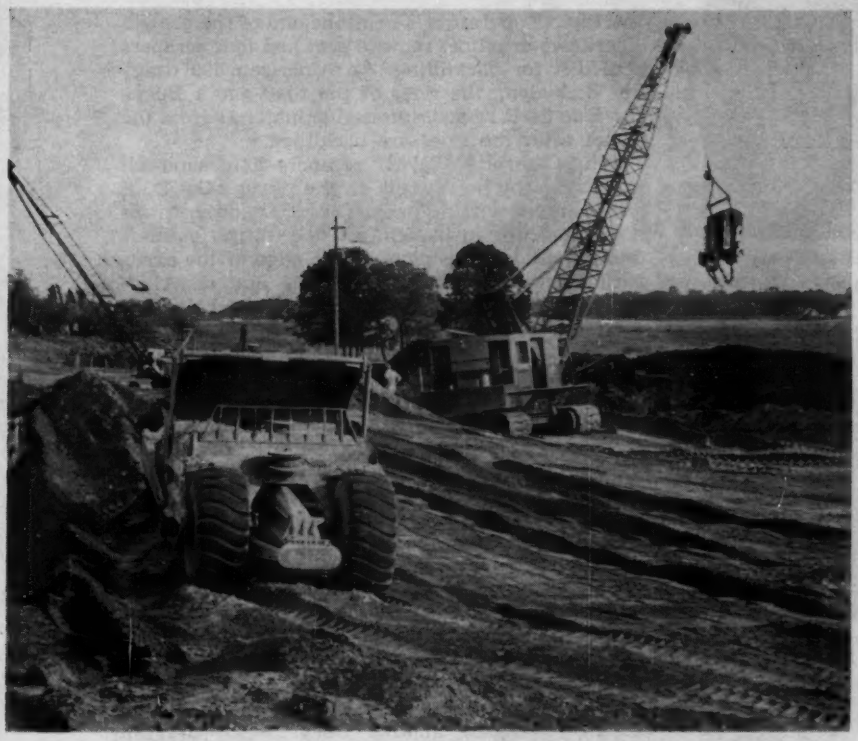
There's also a hydraulic dredge on the job. It digs peat and mud near the river crossing and places sand fill from an underwater borrow pit. The dredge speeds earthmoving by freeing draglines and scrapers for work in other areas along the project.

At the start of the job, most earthmoving rigs worked in a big road cut at about the midpoint of the project. Because this cut was scheduled to supply dirt for embankments at the bridge, it was necessary to complete the fill between the cut and the bridge so that it could be used as a haul road.

Embankments at the bridge must be completed early so structural work can begin, but moving nearly 300,000 yd of dirt over the 4-mi haul tied up earthmoving equipment and slowed down other parts of the job. To speed the work and reduce the haul distance, the contractor checked areas near the river for other sources of fill material.

Investigations uncovered several large underground sand deposits near the bridge site, and Johnson Brothers decided to try dredging. It was subcontracted to A. Kertzman Dredging Co. of Winona, Minn. Their portable dredge handles both the removal of unusable peat and the placing of sand fill at the bridge site.

The dredge, built by Kertzman, is powered by a 600-hp Chicago Pneumatic engine and equipped



SWAMP REBUILDERS—Scrapers haul in fill material from a nearby borrow pit and dump it close to the edge of the excavation. Then Caterpillar and Allis-Chalmers dozers push dirt into the excavation and level the fill.

IN DRY BORROW PIT—Crawler tractors work in tandem to push-load scrapers.

IN WET BORROW PIT — Hydraulic dredge removes overburden, pumps fill.

Beats Bad Weather

with a Caterpillar 353 electric set. The cutter head is 36 in. in dia; intake dia is 14 in. and the discharge dia is 12 in.

The dredge removed 130,000 yd of swamp soil and now is placing 300,000 yd of sand fill. Unusable material as well as overburden from the sand pit was dumped in a nearby waste area.

After removing overburden, the dredge started to pump sand, which extends from a depth of 7 to 32 ft. The dredge can reach to a depth of 34 ft. Working around the clock, Kertman pumps an average of 5,000 yd of material a day.

While the dredge takes care of moving dirt at the river crossing, Johnson Brothers put scrapers to work on other parts of the project. Work progressed in both directions from the big cut area at the middle of the job until other cuts along the road were reached. Then the contractor abandoned the big cut and took fill from the smaller cut areas. The scrapers will return to the big, centrally located cut during the second phase of earthmoving.

Workhorses on swamp excavation are crawler-mounted draglines that move on timber mats. The rigs remove peat and mud and dump it along the sides of the road where it later is leveled by dozers. Scrapers and dozers follow the draglines closely to backfill the excavations with good material.

continued on next page

ROCK WORK—Allis-Chalmers tractor with rock bucket dumps rocks into dragline bucket. Crane places riprap at embankment.

LOADING—Tractor push-loads Cat scraper in a road cut while an Allis-Chalmers tractor with disks aerates the fill material.

DUMPING—Cat DW20 scraper dumps its load on fill at edge of excavation that is filled with water seeping in from the swamp.

LEVELING—Allis-Chalmers HD-21 tractor pushes fill dirt into excavation to displace water. Earthmovers also compact the fill.

TWO-STAGE EARTHMOVING . . . *continued*

The job is simple where the swamp is fairly stable, because the sides of the excavations remain in place until sand is dumped. The draglines excavate the swamp until they reach good material, which sometimes is as much as 20 ft deep. Then scrapers dump fill into the excavation and dozers level it. If water is present, and it usually is, the fill dirt is dumped into the excavation to displace it. No dewatering equipment is needed.

Where the swamp soil is unstable, the draglines first excavate along the edges of the road and dozers backfill these areas. Then the material between the two backfilled strips is excavated and backfilled. This procedure prevents the sides of the excavation from caving in.

Because only two to four scrapers are needed to keep up with a dragline, Johnson Brothers work in several areas at one time and handle each excavation and road cut with a relatively small spread of equipment.

A typical operation is near one end of the project where two draglines remove peat and four scrapers haul dirt for backfilling. An American 599 dragline digs along the sides of the road and a Bucyrus-Erie 54-B removes unusable material from the center after the sides are backfilled.

Four Caterpillar DW21 scrapers haul sand fill from a nearby borrow pit. In the pit two Cat D8's, one equipped with a Pushin-Cushin, load the scrapers by pushing in tandem. On the fill the scrapers dump their loads as close to the edge of the excavation as possible, and a Cat D7 and an Allis-Chalmers HD-21 push the dirt into the hole. The earthmovers compact the fill sufficiently by traveling on it so no other compaction is needed.

Elsewhere along the road, similar operations are going on at the same time. At the river crossing, the completed portion of the embankment is protected with rock riprap. An Allis-Chalmers HD-11 with a rock bucket places most of the rock, and a Bucyrus-Erie 22-B crane with a dragline comes in handy where the tractor can't reach.

The dredge is on the other side of the river and beyond it more eathermovers handle the work load. In one road cut, three Cat DW21's and a Euclid TS-18 haul dirt; a D9 push-loads scrapers. To help aerate the fill material, Johnson Brothers work the cut with disks pulled by an Allis-Chalmers crawler tractor.

Material from this area serves as fill at the end of the job where another Bucyrus-Erie dragline has stripped the unusable soil. On the fill, scrapers dump their loads in piles because they can't travel on the wet subbase. A D9 spreads the material.

On the other end of this area, two Cat DW20 scrapers place material hauled in from another cut farther along the project. These scrapers also dump their loads at the edge of the fill, and a D9 levels the material. Other DW20's, working in the same cut, haul dirt in the opposite direction.

Hauling dirt in two directions from one cut requires only four pushers to load the large scraper fleet because the tractors do not waste time backing up. Two tractors in this cut are Allis-Chalmers HD-21's, one is an HD-20, and one is a Cat D9. Caterpillar No. 12 motor graders maintain haul roads and aerate the cut.

Ahead of all these operations another Bucyrus-Erie crane with a dragline bucket excavates more peat and mud to make way for the road fill. The soil here is relatively firm, and the 5-yd dragline can cover the entire width of the excavation while moving along the center of the road. But timber mats under the crawler tracks still are necessary.

To complete the earthmoving, Johnson Brothers will excavate nearly 1 million yd of peat and other unusable swamp material, and scrapers will move 2.1 million yd of earth from road cuts and borrow pits. The dredge will place an additional 300,000 yd of sand for embankments at the bridge.

The contract calls for completion of earthmoving in 183 working days. To meet this schedule, Johnson Brothers are working two shifts a day, six days a week. For night work, the cuts, fills, and other areas of activity are illuminated by flood lights mounted on masts that are attached to 3,500-w Onan portable electric plants.

Project manager for Johnson Brothers, Highway & Heavy Constructors, Inc., is J. R. Johnson. Job superintendent is Carl Baumgartner, and Bill Schaefer is equipment superintendent.

Core Drill Mounted On Truck Sinks 3½-Ft-Dia Holes

LIGHTWEIGHT WORKHORSE — Rotary drill and truck weighing 30,000 lb are lifted into position and set on girders that support rig above 30-ft-deep cellar. The drill cuts 40-in.-dia cores 70 ft deep.

CORE DRILLING methods and a light, truck-mounted rotary drilling rig are solving the problem of sinking 42-in.-dia holes through hard rock at 18 missile sites in Kansas. The holes reach to a depth of 70 ft below ground and will serve as vents.

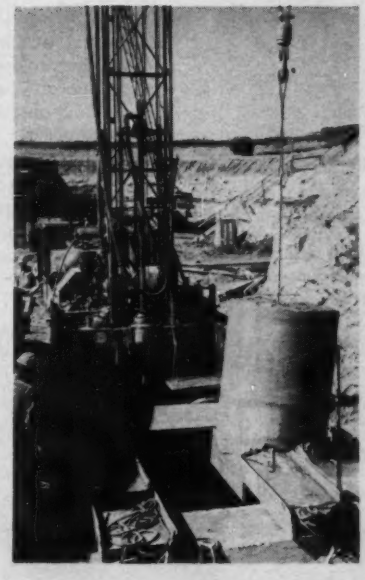
Each hole extends below the 30-ft-deep bottom of a 20x28-ft cellar located near the launch silo. The nearby silo limits the working area and rules out straight rotary drilling with cone-type bits and a conventional oil field rig.

Also, there is no room to dig mud pits, and steel pits on top of the ground would obstruct other construction activities. In addition, the depth of the cellar would present fluid lifting problems by slowing up-the-hole mud velocity, according to consulting geologist Robert R. Aitken of Wichita, Kan.

Putting a drill rig in the cellar also was out of the question because there wasn't room for a drill with enough power to produce the necessary torque.

After trying out a large-diameter auger, which proved inadequate in the hard rock, the engineers selected a truck-mounted Blastmaster drill made by the George E. Failing Co. of Enid, Okla. This rig was small enough to work in the limited space and could drill the holes by a continuous coring method.

To support this rig over the cellar, a pair of portable steel girders was fabricated to span the cellars. Each girder consists of two 30-in. beams with the 10½-in.-wide flanges of the two beams welded together. The girders weigh 8,184 lb apiece, and a pair of them can support a 50,000-lb load. This is plenty to hold the 30,000-lb weight of the truck and drill.



Two types of core barrels are used, depending upon the hardness of the rock. All barrels are fabricated from ⅜-in. steel stock and each has a 6-in. hole at the top for a six-bolt flanged connection. Barrel lengths range from 4 to 7 ft.

Barrels for drilling through soft materials have two spiral flights of ½-in. key stock on the outside, bottom to top, and six cutter blocks faced with tungsten carbide on the bottom rim. Barrels for hard rock have smooth sides and are fitted at the bottom with a 7-in. shoe made of ⅝-in. hot rolled bar stock.

The drill cuts through soft rock at the rate of 5 ft per hr, using air for circulation. The rate for drilling through hard limestone is 1½ to 4 ft per hr. Rotation speeds for the smooth barrel range from 12 to 60 rpm.

Core cutting progresses until the barrel is full. Then it is pulled and set aside while the rock core is withdrawn from the hole. First, a 4-in.-dia hole is drilled through the center of the core with standard steel rock bits. Then a cable is attached to the core with a sand hitch with a tapered steel cone on a sucker rod, using 0.08 to 0.112 sand.

After the cable is secured, a pull is applied on the sand hitch and the core is broken loose along its natural parting formations. Where this pull is not enough to detach the core, a circle of Primacord is detonated at the bottom of the cut to break the core away from the rock.

Total drilling costs run about $21.50 per ft in limestone. Moving the drill between holes takes about 1½ hr.

Twin Trains Place Patchwork

Paving runs were limited in length, but twin paving trains backed up by an automatic central-mix plant combined to place the equivalent of 1½ mi of road slab per day at Chicago's O'Hare Field. It took 900 separate runs to pave a 120-acre parking apron there, but fast moves between runs kept production high.

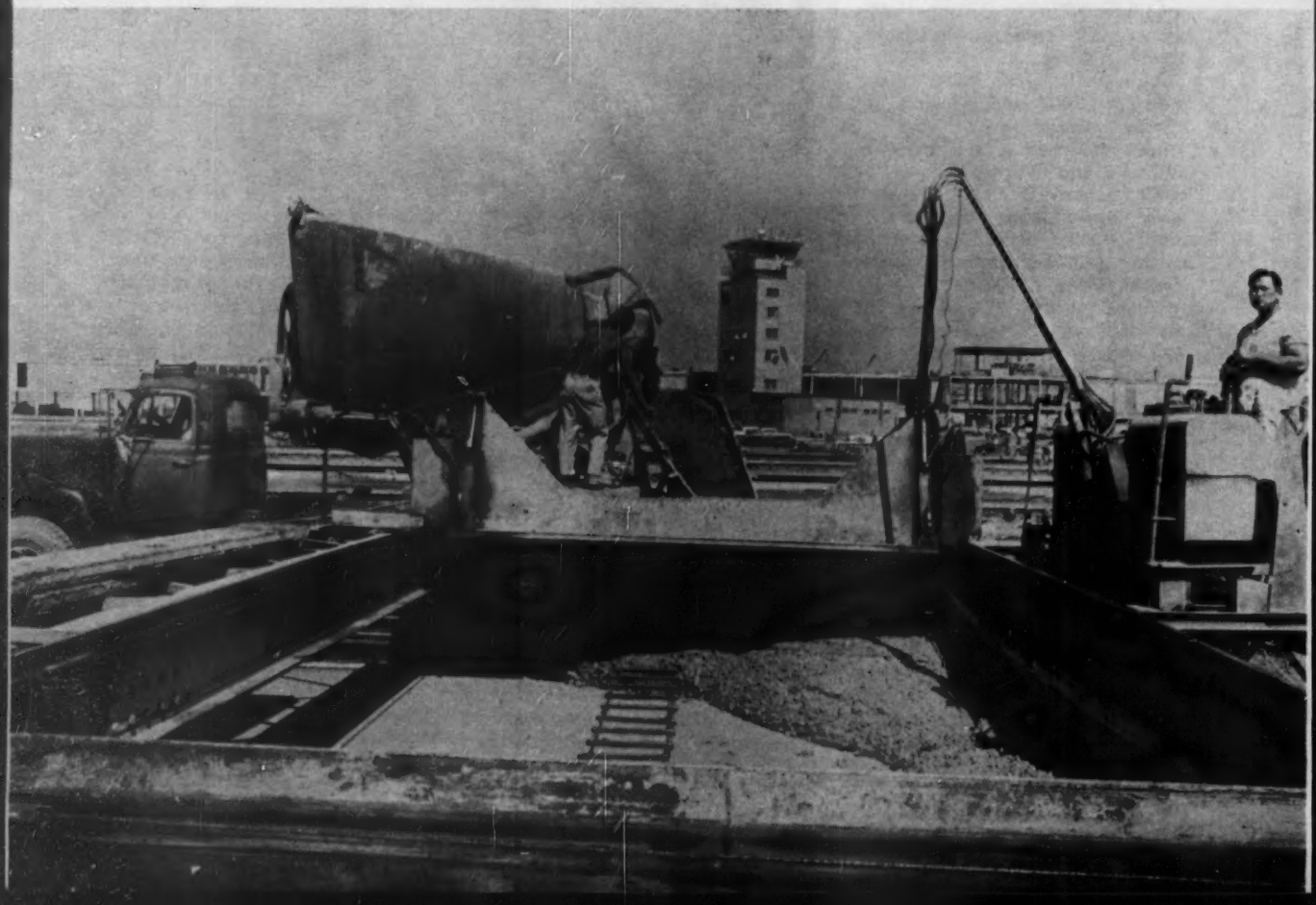
By ERIC AIKEN
McGraw-Hill News Bureau, Chicago

A WILLINGNESS to use extra equipment on a tightly bid concrete paving job paid off for a contractor at Chicago's O'Hare International Airport.

To place 600,000 sq yd of concrete paving, Arcole-Midwest Corp. of Skokie, Ill., assembled a high production central-mix plant that fed two paving trains. At the plant, twin mixers loaded trucks equipped with special agitating bodies. With this equipment, the contractor hit a production rate of 80,000 yd of concrete put in place per month.

High production was a must on this job because the construction timetable called for a 200-day completion schedule. And Arcole left a substantial sum of money on the table when they bid the job. Their $6.3-million low bid was more than $900,000 below the next contractor's price.

The job called for paving 120 acres of parking apron and taxiway around the finger-type concourse that joins two new passenger terminals at O'Hare. The parking apron that forms the bulk of the 120 acres of paving is surrounded on three



TWO PER TRAIN—Truck with special agitating body dumps concrete into hopper of one of two Maxon spreaders that lead each train.

Pavement

sides by a taxiway. The fourth side adjoins the concourse of the terminal buildings.

The 25-ft-wide lane of pavement adjacent to the concourse is 10 in. thick. The second lane is a transition from 10 in. to 15 in. The remainder of the lanes are a uniform 15 in. thick, accounting for about 90% of the paved area.

The paving sequence was set up to give the maximum number of long paving runs. Many of the lanes change direction four or five times in their loop around the apron. Some of the pavement sections are only 60 ft long. Others range up to 1,200 ft. Because of the configuration of the apron, the job involved a total of 900 sections of pavement. Oddly shaped segments at the corners of the loop were paved by hand.

Best day's production attained by the twin paving trains was, under these circumstances, remarkable. The paving crews combined to place 13,100 sq yd of 15-in.-thick pavement in a 9-hr day. This is equivalent to almost 1½ mi of 24-ft-wide, 10-in.-thick highway pavement.

First in line in each paving train was a Maxon Dumpcrete spreader that placed the bottom 11 in. of concrete. Then workmen placed welded wire reinforcing mesh and vibrated the concrete ahead of the second Maxon spreader, which placed the top 4 in. of pavement.

A Rex screw spreader with vibrating screed worked close behind each second spreader. The fourth unit in each train was a Blaw-Knox finisher-float. It mounted two screeds in front, plus another screed at the rear that replaced the bull-float common in many paving trains. Also at the rear of the finisher-float was a 30-in.-wide troweling shoe that kept the pavement surface within a tolerance of ⅛ in. in 10 ft.

Next in line came a Rex transverse joint forming machine. This was followed by a Heltzel Flex-Plane equipped with a transverse belt in front and a double burlap drag at the rear to give the pavement a rough texture.

The last machine in each train was a Clary bridge that carried a single burlap drag to smooth out any transverse irregularities. At the rear of the train, a workman sprayed curing compound on the freshly placed concrete. He was followed by a crew with long-handled sweeps who gave the concrete a finishing touch. Altogether, each paving crew numbered 21 men.

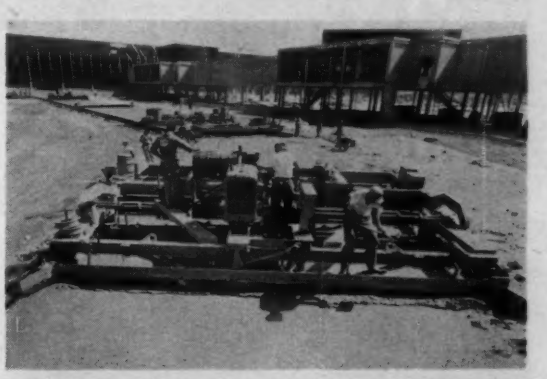
A fleet of 15 Agitor trucks made by S&M Manufacturing Co. of Milwaukee fed concrete to the two Maxon spreaders in each paving train. The 8-yd hydraulically controlled Agitor units were mounted on International R 190 chassis. Haul distance from the central-mix plant averaged less than 1 mi.

Backing up the twin paving trains was a completely automatic central mix plant. The twin-

continued on next page

TWO COURSES—Workmen vibrate 11-in. bottom course through welded wire mesh. Second spreader will place 4-in. top course.

SCREW-SPREADER—Third machine in line is screw spreader with vibrating screed that levels freshly placed apron concrete.



FINISHER FLOAT—Three screeds strike off concrete while 30-in. troweling shoe at rear keeps paved surface within tolerance.

ROLLER SCREED—At rear of each train, Clary screed with three revolving rollers smooths out any transverse irregularities.

CENTRAL PLANT—Big plant with twin mixers backs up twin paving trains. Capacity of the plant is about 550 yd per hr.

AUTOMATIC CONTROLS—Operator selects mix and charges mixer with a flick of button on panel. Weighing is automatic.

MIXERS—Driven by 40-hp motor, mixer loads agitator truck with 8-yd batch in 10 sec. Entire mixing cycle takes about 90 sec.

TWIN TRAINS PLACE PATCHWORK PAVEMENT . . . *continued*

mixer plant was designed by the Rex Construction Machinery Div. of Chain Belt Co. With a 90-sec mixing cycle (including charging) as used by Arcole, the plant had a capacity of 550 cu yd per hr, or an 8-yd batch every 52 sec.

The mixers are size 210S, capable of mixing 8½ yd. They are each driven by twin 40-hp motors. Each mixer is tilted by a 30-hp hydraulic motor. Each can load an Agitor in 10 sec.

A fully automatic system provides high production. A single operator controls the plant simply by pressing a button to charge and discharge the mixers. Weighing is done by fully automatic controls with a recycle feature. Automatic sequence controls preblend material as it enters the mixers. The charging chute is automatically interlocked with the mixer controls.

Two 750-bbl silos equipped with loading screws hold cement. Each cement silo is charged from transport trucks by means of two compressed air lifts leading to the top of the silo. Cement is delivered by rail to a siding about 2½ mi from the job.

Trucks haul aggregate to the site from Arcole's own plant at Algonquin, Ill., about 27 mi from O'Hare. At one time, Arcole used a fleet of 90 trucks to haul aggregate and subbase material. At the central-mix plant, a team of bulldozers and cranes with clamshells stockpiled sand and stone.

Conveyors extending into reclaiming tunnels beneath the stockpiles fed aggregate to the central-mix plant. The plant contained a three compartment aggregate bin with a total capacity of 250 tons. After weighing, the aggregate was charged by a high-capacity 48-in. belt with a 60-hp drive. This belt charged a mixer with aggregate in 18 sec.

Specs called for a six-bag concrete mix. Daretard retarding and water dispersing agent was added along with Darex for air entrainment to obtain higher slump concrete without sacrificing strength. A minimum flexural strength of 700 psi was required at seven days.

Generally, there was a three-day spread between placement of concrete in adjacent lanes, which were constructed flush against each other. The longitudinal joints were sawed. Transverse joints spaced on 50-ft centers were sealed with a cold-mix polysulfide plastic poured in the grooves made by the joint forming machine. These grooves were covered with adhesive tape until filled to retain moisture for curing and to keep out dirt.

At the Start

Before preparations for paving began, a scraper fleet cut out some 500,000 yd of undesirable wet clay from the apron area. Subcontractor Lindahl Bros. of Chicago handled this earthmoving with eight scrapers—Euclid, LeTourneau-Westinghouse and Caterpillar units—with heaped capacities of 18 to 20 yd. The scrapers hauled the wet material to a nearby field and spread it in thin layers to dry. A 35-truck fleet returned the material to the apron area when it had dried.

After compaction of the subgrade, trucks spread granular subbase material to the required thickness. A Blaw-Knox subgrader brought the material down to within ¼ in. of final grade. The material was then moistened as necessary and compacted with an International Vibration Co. Vibro-Tamper. Required compaction usually was attained in a single pass.

A four-man crew installed the heavy-duty steel forms with the help of an old Army 6x6 equipped with a home-made swinging boom. The boom worked off a pto on the truck engine. Capacity of the rig is roughly ½ ton. Air hammers drove the paving pins below subgrade to prevent forms from overturning under the paving train.

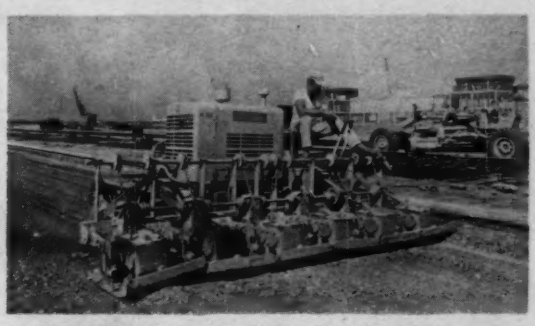
To make way for fuel standpipes and electrical outlets in the pavement, Arcole installed prefab timber box-outs ranging in size from 2x2 ft to 20x20 ft. Box-outs were fabricated in two pieces—an 11-in. bottom section and a 4-in.-deep top section—to leave a gap for the reinforcing mesh. During paving, the crew snipped mesh from around the box-outs as they were encountered.

To coordinate their complex operation, Arcole relied on radio communication. All trucks and supervisors' cars were radio equipped. A station at the central-mix plant was linked with the paving trains to control delivery of concrete. The base set in the contractor's field office monitored messages from the control tower to facilitate movement of heavy equipment near the runways.

Project manager for Arcole-Midwest was C. H. Fahrberger. General superintendent was Walter Watson. His brother Wilbur was paving superintendent. Walter Metsche is project engineer for Naess & Murphy, architect-engineers in charge of the entire O'Hare project.

Scrapers Undercut Apron, Then Crews Prepare the Base

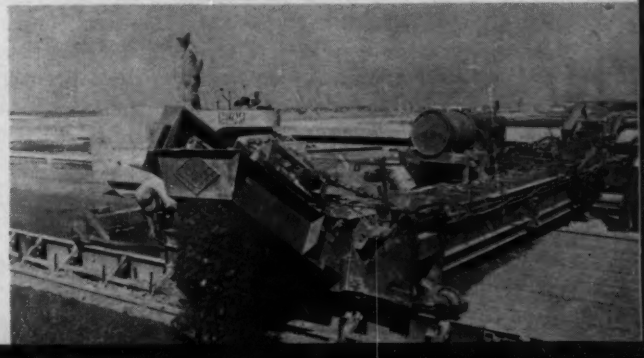
EARTHMOVING—Euclid scraper gets assist from push-dozer to load wet clay that was undercut, dried and then replaced.



COMPACTING—International Vibration's Vibro-Tamper compacts subbase material after it has been moistened by a sprinkler truck.

PLACING FORMS—Crew places paving forms with the help of job-built swinging boom mounted atop old Army 6x6 truck.

SUBGRADING—Blaw-Knox subgrader levels subbase material to within ¼ in. of finish grade to make way for paving train.



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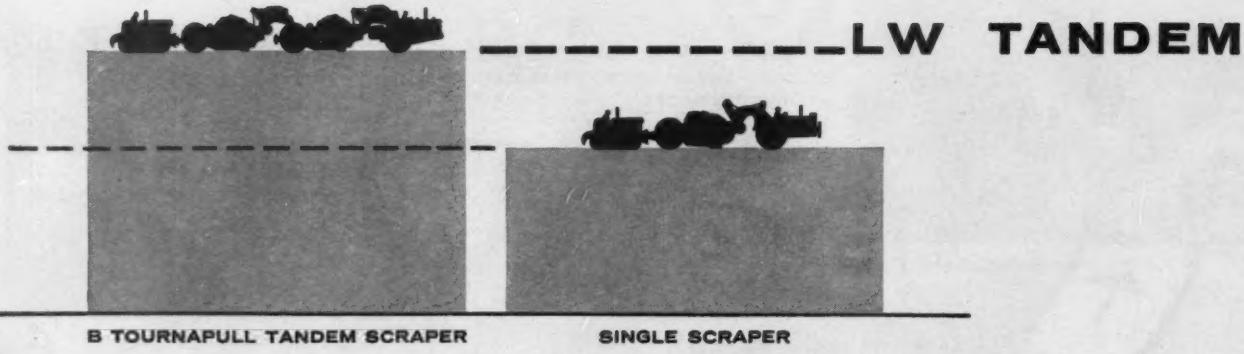

On cut-and-fill operation near Hebron, N.D., this B 'Pull* Tandem works side-by-side with a similar-size single self-propelled scraper... produces more yardage per dollar of investment during a 22-hour time-study. Digging sandy clay and occasional slab sandstone, "B" loads front scraper first, then rear scraper... gets an average 43-yd load in 43 seconds... requires no larger pushers than same-size single-scraper units.

MOVES 50% MORE DIRT PER HOUR

Latest *stop-watch* proof of the tremendous yardage possible with LeTourneau-Westinghouse *tandem* scrapers comes from a project on Interstate Highway I-94 in North Dakota. Joint-venture contractors William Collins & Sons (Fargo, N.D.) and Joe Mayo Construction Company (Cavalier, N.D.) recently permitted engineering observations over 22 hours of actual work-time, of a big B Tournapull® pulling two Fullpak® scrapers, and of another-make similar-size *single* scraper.

Side-by-side the two rigs worked, building a 500′ approach to an overpass at U.S. 10, 6 miles east of Hebron, N.D. With sometimes one, sometimes two pushers, they loaded dry, hard sandy clay and occasional slab sandstone. The one-way haul varied from 1825′ to 2725′, with up to 1200′ on −3% grade, 725′ on −5%, and up to 500′ travel on the fill. Time-study figures were recorded separately by length of haul . . . one pusher or two . . . time for each part of the cycle . . . trips per hour, etc.

Results show the B Tournapull with tandem scrapers on 2725′ hauls averaged 301 bank yds-per-hr using one push-tractor, 324 yds with two pushers — compared to 204 and 218 yds-per-hr respectively for the single-scraper rig. On 1825′ hauls the "B" averaged 402 and 443 yds-per-hr . . . compared to 259 and 278 yds. Naturally it took slightly longer to load, haul, and spread *two* scraper-loads behind the "B", compared to the similar-size "single". But in *all* cases the B Tandem outstripped its competitor in yds-per-hr . . . by from 48 to 59%.

Every yard has a bigger profit-margin, too! This 50% larger output is available to you for only about 35% more than your original investment in an LW prime-mover and single scraper. *Only* LeTourneau-Westinghouse offers you *practical* tandems with exclusive LW electric operation for instant control power to the remote points of your two scrapers. LW Tandems are available in combinations from 18 to 64 yds heaped capacity. Ask for full details, today.

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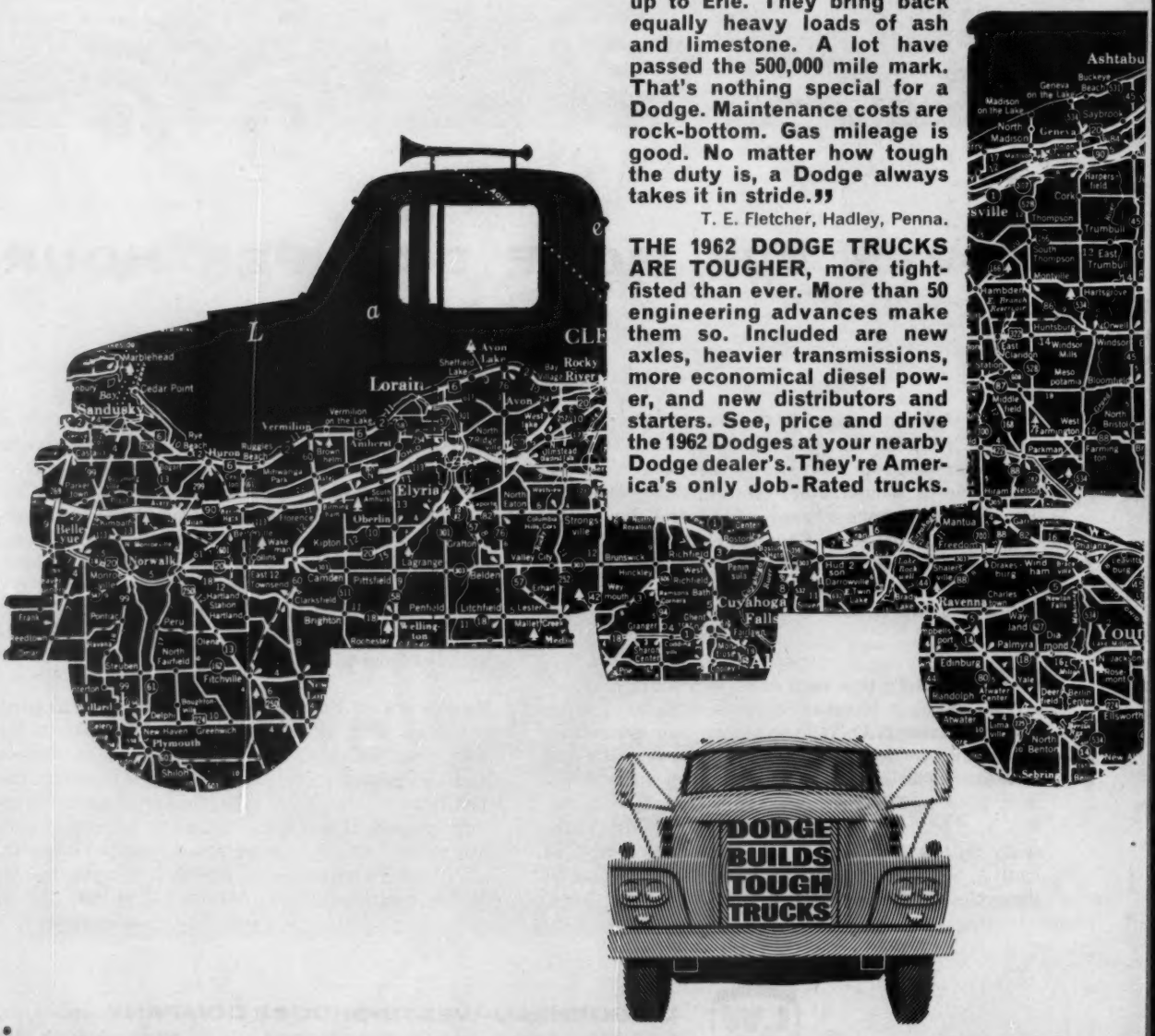

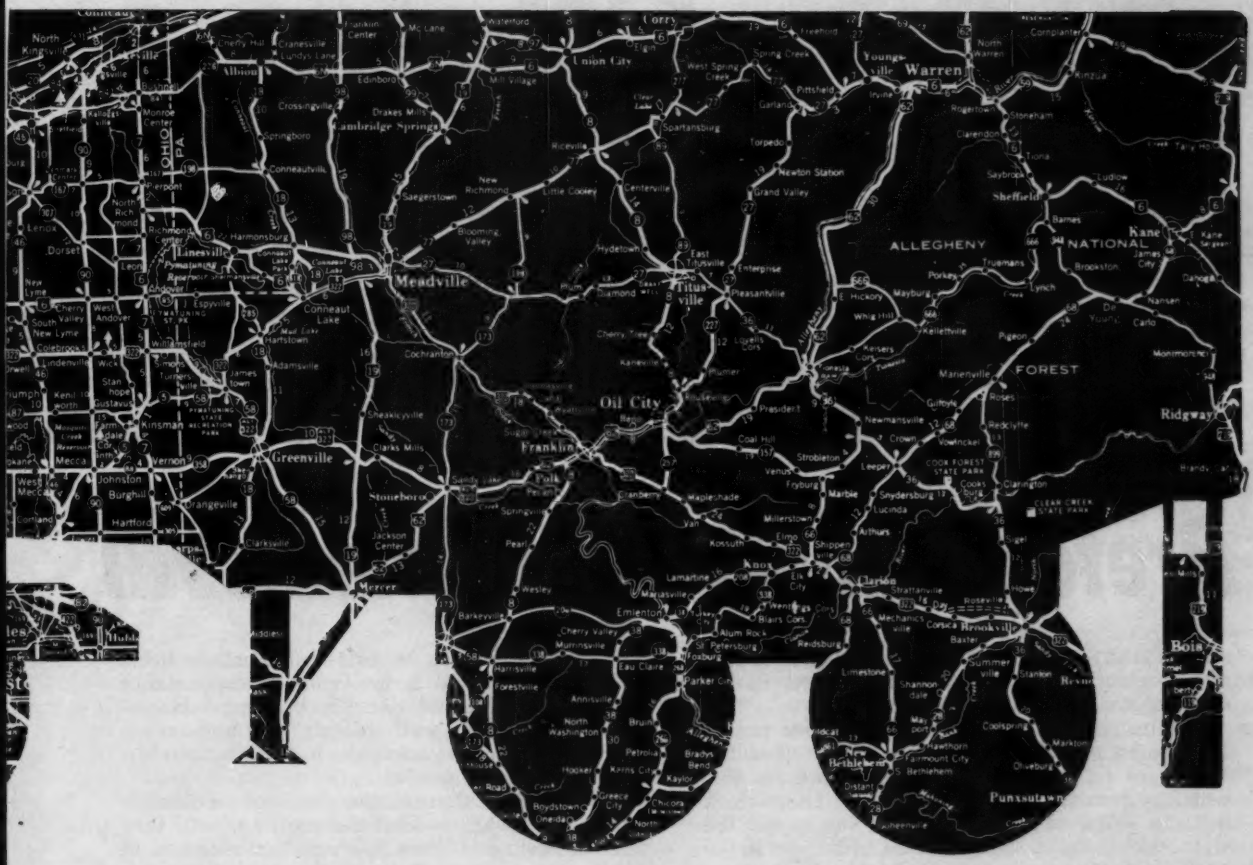

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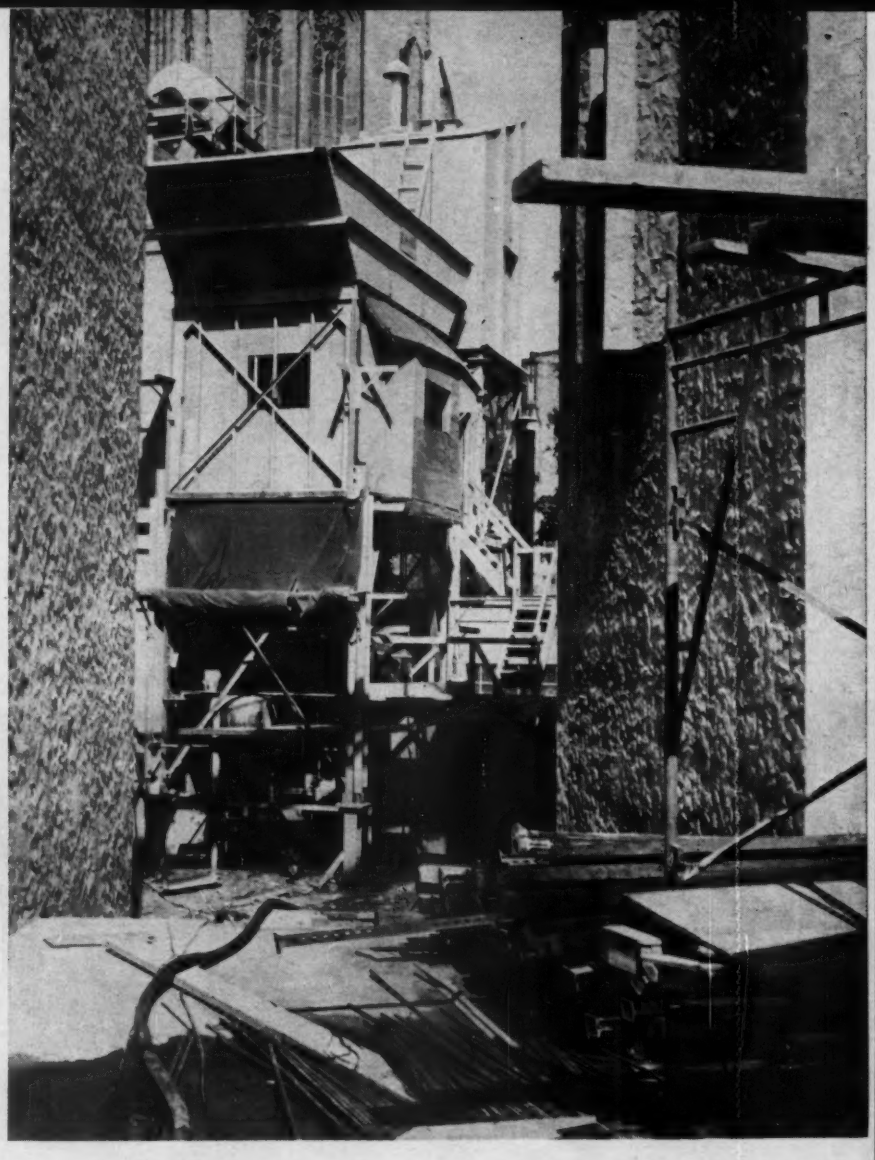
Circle 101 *on Reader Service Card*

FIRST STEP—Symons 8-ft prefab panels form walls despite their unusual shapes.

RUBBLE—Next, 3 to 8-in. granite chunks are placed by hand in empty forms.

BATCH PLANT—Grout, a 2:1 mix of sand and cement, plus additives, is batched in Blaw-Knox plant. Then Azar Grouter at base pumps grout through 3-in. hose.



Prefab Panels Form 'Medieval'

AN UPDATED METHOD of handling stone and mortar gives the look of the Middle Ages to two colleges going up at Yale University.

Granite rubble is placed by hand inside prefab forms used for pouring exterior walls. When the forms are full of rock, grout is pumped in. The next day forms are stripped from the 11-in.-thick walls, a ½-in. of grout is scraped away—and the wall looks like something erected in Europe in the 1400's.

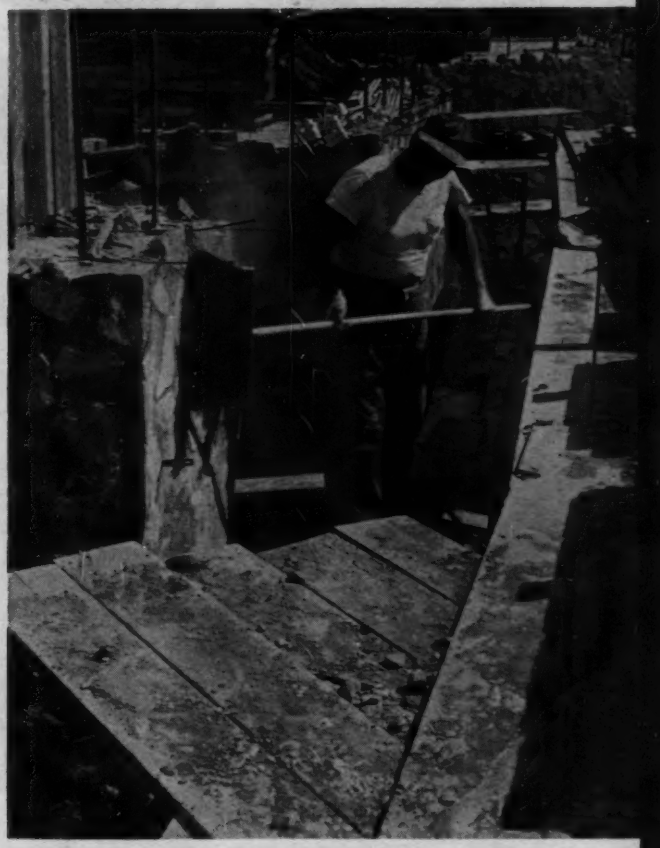
This is the first time the intrusion technique has been employed in the United States for building superstructures. Advantages of the intrusion wall are that it is more economical than stone placed by masons, and it goes up more quickly. Buildings have been erected in Scandinavian countries in recent time with the technique, a modernized version of methods used in the Middle Ages.

Thirteen buildings make up the two colleges, which form two irregular half-circles back to back. To achieve the wandering, monastic appearance of Middle Age construction, the buildings' rubble-and-grout exterior walls contain no right angles. No two buildings are the same. No two rooms within the buildings are alike.

When E. & F. Construction Co., Inc., of Bridgeport, Conn., was awarded the contract, both they and the architects, Eero Saarinen & Associates, of Birmingham, Mich., figured the tricky exterior walls would be sub-contracted to a stone specialist. But as Philip Epifano, Sr., president of E. & F., studied the problem he decided his company could do the job as well and more economically.

Extensive experiments were carried out long before the job began. The architects built test walls to see if the desired rough texture plus adequate strength could be achieved. Then E. & F. conducted later experiments to perfect production techniques.

POURING—Separate 10-ft hoses, placed before rubble and held unkinked by lengths of pipe inside, are coupled to pouring lines.



FINISHING—Next day, forms are stripped, ½ in. of grout is scraped off, and wall brushed. Finally, curing agent is applied.

By GORDON R. SMITH, Assistant Editor

Grouted Walls

Despite the lack of uniformity of walls and buildings, Symons Steel-ply prefabricated panels are used as forms for pouring the craggy exterior walls. Standard 2x8-ft panels are placed and topped with a row of panels laid horizontally. A 9-ft lift is average. Symons panel ties spread the forms, and wedges and connecting bolts join panels. Support for the forms comes from four 2x4 walers.

Because all corners are odd-angled, they are formed with plywood end pieces reusable for the entire height of a corner. Patent Trouble Saver 2-in. sectional steel scaffolding in 5x5 and 5x6-ft frames is erected shortly after the forms to accommodate rubble placement and grouting crews.

Rubble is granite no smaller than 3 in. in its largest dimension and no greater than 8 in. The stone is crushed, screened, and delivered to stockpiles at the site ready for placement. It is supplied by Gencarelli, Inc., of Westerly, R. I.

Grout is a carefully measured mixture of sharp sand, cement, water and additives. A 10-bag mix is used. For each bag of Nazareth No. 2 cement are added: 186 lb of sand; 5 gal of water (this is varied slightly with the moisture content of the sand); ¼ lb of Pozzolith; and ½ lb of Intrusion Aid, a product of Concrete Chemicals Co., a subsidiary of Intrusion-Prepakt, Inc.

This last additive could be called the key to the whole operation. It prevents grout from contracting or setting prematurely and insures a tight bond with stone. Another key is the Sika Rugasol that is brushed on the inner face of the outer forms. It deadens the outside ½-in. of grout that is scraped away after stripping.

Grout is forced through hoses by an Azar Grouter built by the Azar Manufacturing Co., of Chatsworth, Calif. It can push grout to the highest point, a penthouse atop a 13-story tower. The unit has a smooth metal-shaft impeller with undulations along its length. Belt-driven by a gasoline engine, the impeller whirls inside a rubber boot to force grout along the hoses.

E. & F. mounted the Grouter in the base of a Blaw-Knox batch plant under the bins where sand, cement, water and additives are measured out and mixed.

Grout is pumped to the exterior wall forms dur-

UNALIKE—Overhead view, above, outlines irregular shapes of buildings. Grout plant will pump a total of 10,000 yd for job.

PREFAB PANELS FORM 'MEDIEVAL' GROUTED WALLS . . . *continued*

ing the afternoons for about 4½ hr Monday through Thursday. During an average day 25-30 yd is placed. None is poured on Friday; once a pour is made forms must be stripped the following morning, and the contractor is working a five-day week.

All of the college buildings' structural members are reinforced concrete. First, interior walls are poured with conventional concrete from crane buckets. Symons forms are used here also.

Then the inner forms of the exterior walls are erected. They are lined with a 1½-in. layer of Dow Styrofoam so that insulation is placed before walls themselves are poured.

The floor slab is formed next, and ⅞-in. reinforcing bars are placed vertically 18-in. c-c for the exterior walls. The outer forms then are erected. Before rubble is dropped in by hand, individual 10-ft lengths of grouting hose are positioned vertically within the forms. Because the usual lift is 9 ft, the protruding hose ends make coupling up easier.

Into each length of grouting hose goes a 10-ft piece of metal conduit pipe. This prevents rubble from crushing hoses and sealing off the grout flow when the pour is underway.

Rubble is brought to the upper working levels in crane-lifted wheelbarrows. Usually four barrows are placed on a platform rigged with four chain lines. The platform is hoisted to the scaffolding where barrows are rolled onto the runway and dumped within reach of the workers placing rubble.

Down below, a Cat D2 dozer keeps rubble in a neat stockpile. Barrows are loaded by hand so that a good range of sizes is available to men at the forms.

The three cranes that lift rubble also handle forms, reinforcing steel, the 10-ft grouting hose lengths, and concrete buckets. A Manitowoc 3900 with a 140-ft boom and 20-ft jib is assigned to the taller tower. Lower levels are served by two 30-ton-capacity MC 524 Lorain truck cranes. Both have 80-ft booms and 30-ft jibs.

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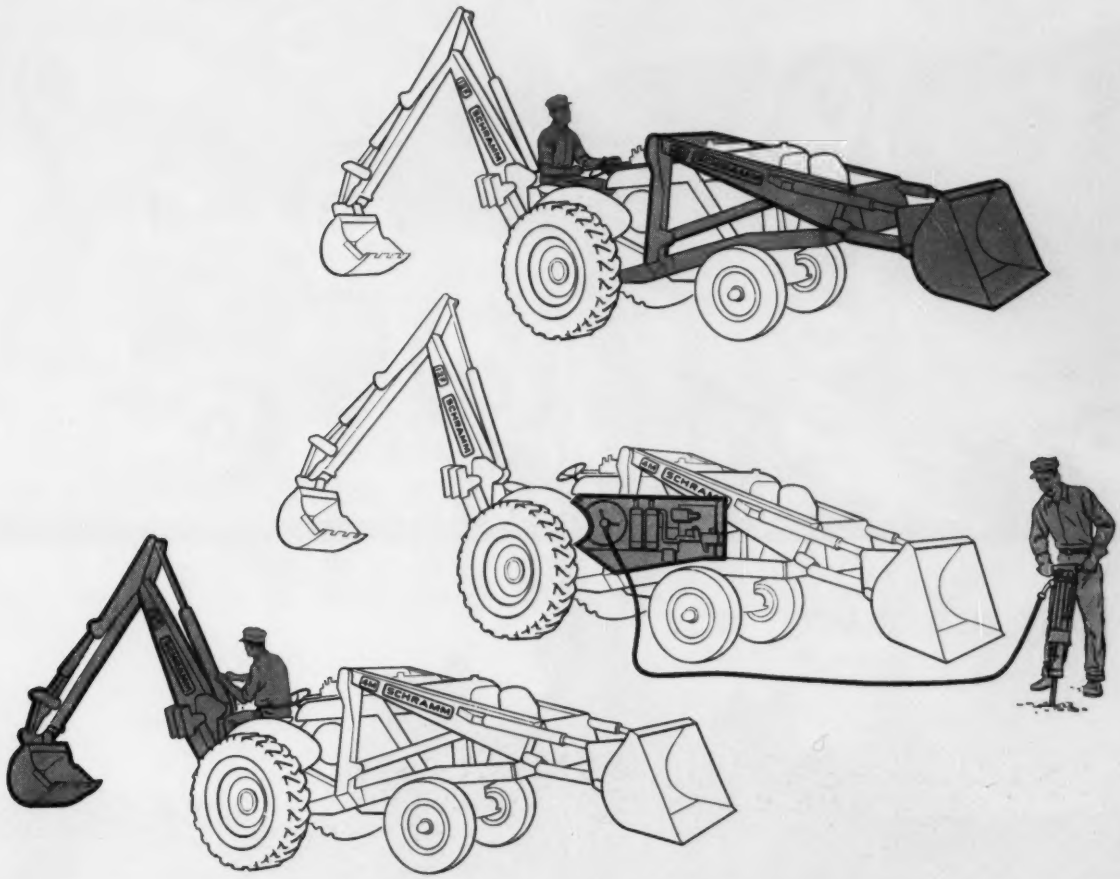

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Now, through the reduced cost of blasting materials and the improved equipment and techniques for drilling, many profit-minded operators in all fields are using explosives energy to accomplish tasks formerly reserved for mechanical equipment. As a result they are realizing valuable savings on shovels, 'dozers, trucks, and total man-hours.

The photographs at the left illustrate just three examples of the many ways explosives energy is being used more fully, more efficiently. On a section of the Turkey Creek Expressway near Kansas City, the objective was maximum breakage and production on every shot. For this contractor, efficient use of explosives energy meant more thorough and consistent breakage, more payload work out of each piece of his equipment, and minimum downtime from end to end of the job.

In another case, a coal stripper in Ohio developed a way to eliminate almost one-half the total mechanical handling of overburden. He used explosives force to cast much of the overburden directly to the spoil pile, thus eliminating almost half of the mechanical handling previously required.

A quarry operator in Maryland boosted his production and lowered his maintenance downtime by using explosives energy to get more thorough, uniform breakage and excellent displacement for easy digging. The result was better production by both the shovel and the crusher—with reduced maintenance costs as a bonus.

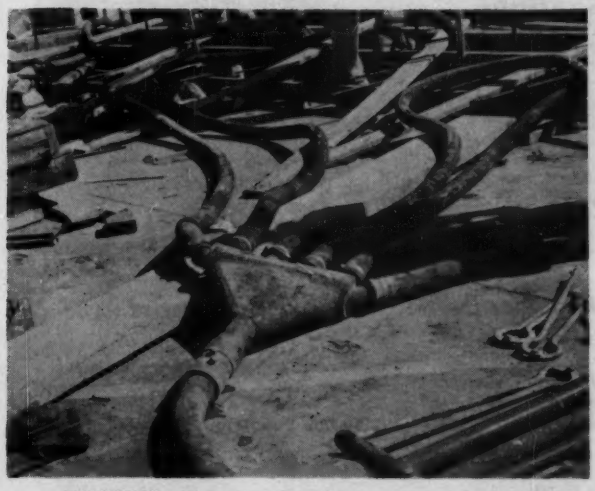
Efficiencies, and therefore savings, like these are available to you too. Your Atlas Representative, backed by Atlas' full line—the only full line of ammonium nitrate and explosives in the industry—can help you select the right combination of explosives, blasting agents (including all forms of ammonium nitrate) and blasting supplies, to meet your particular requirements.

New, modern facilities are now in production at Joplin, Mo. and Reynolds, Pa., to assure ready availability of all Atlas products. And to give you faster, more flexible local service, expanded distribution facilities are being established coast-to-coast. For prompt assistance, call in your Atlas Representative. Or, write to:

ATLAS CHEMICAL INDUSTRIES, INC.
EXPLOSIVES DIVISION • WILMINGTON, DELAWARE

ATLAS EXPLOSIVES

FLOW CHECK—Worker monitors grout flow in one of six 2-in. manifold lines. Reinforcing bars are ⅞-in. dia, spaced 18-in. c-c.



MANIFOLD—Main, 3-in. hose from pump runs to tee at pour; 2-in. tee lines then go to manifolds, above, that feed forms.

PREFAB PANELS . . . *continued from page 104*

from the grout hoses and the grout lines are coupled up. A main 3-in. line from the Grouter runs to a tee at the work area. A valve here gives the grouting team control of the flow. Two 2-in. hoses go from the tee to two metal manifolds. Each manifold has six nozzles. From these nozzles run intermediate 2-in. hoses that connect to the lengths positioned in the forms. Maximum number of lines placing grout at one time is 12.

An average 24-ft-long pour takes about half an hour. No vibrating is permitted because it would settle rubble to the bottom of forms, but the outside form is tapped with a hammer to fill voids. The tapping sound, hollow or firm, also tells workers the level of the rising grout.

When the grout nears the top of the forms, hoses are pulled out and held manually to spread the final few inches of mix. The valve is then shut off quickly.

Flow from the hoses also can be shut down at the pour site by flipping a safety switch on an electric cord running from the Grouter. A Globe Pocketphone two-way radio gives the grouting crew contact with E. & F.'s batching plant.

After a pour, the 10-ft lengths of hose are sent down to be washed out. Several sets of hose are in circulation so that the pour can continue through the afternoon. Exterior wall poured one day is ready to be stripped the next morning. Then ½ to ¾ in. of grout is cut back with hand scrapers to give the wall a rough texture. The original idea had been to etch the walls with an air-water pressure blast. But this could have allowed erosion to start around stones and the plan was abandoned.

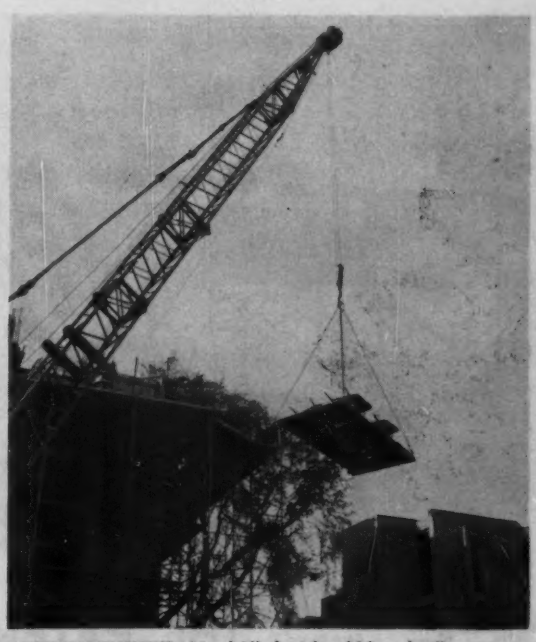
Next the wall is brushed clean and sprayed with Toxkure curing compound. Strength reaches 5000 psi. The job requires about 10,000 yd of grout and 20,000 yd of conventional ready-mix concrete.

Another challenge of the project was the initial layout of buildings. Instead of providing drawings showing the hundreds of dimensions and elevations for the odd-shaped structures, architects' plans carried a grid-line system. The two colleges are on a cramped 500x700 piece of land curved by a boulevard at one corner. Structures on the drawings were shown in relation to 100-ft-sq blocks.

E. & F. Chief Engineer William Horsley solved the layout problem by working from permanent sighting pins. The pins were driven to provide reference points for use throughout the job. When excavation was completed, nails were pressed into the footings to indicate building limits. Distances and angles then were double-checked against the initial markers.

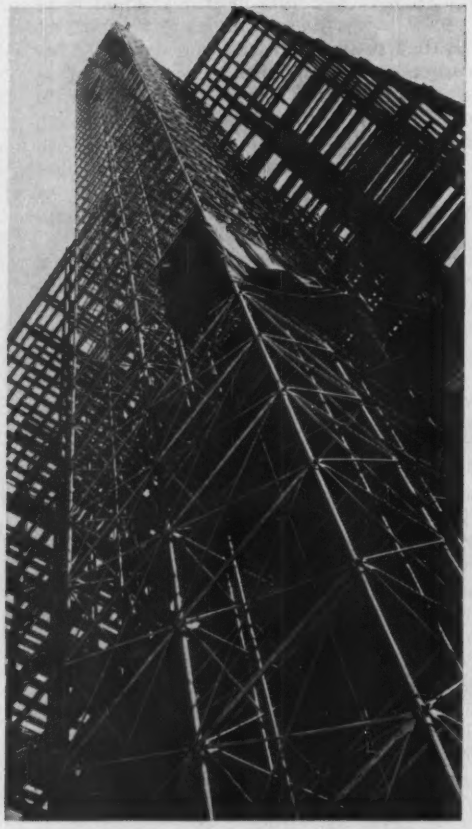
The Yale project will cost $6.8 million and is scheduled to be completed late next spring.

Louis Susi is project superintendent for E. & F. and William Horsley is chief engineer. Kenneth Haynes is resident architect for Eero Saarinen & Associates.



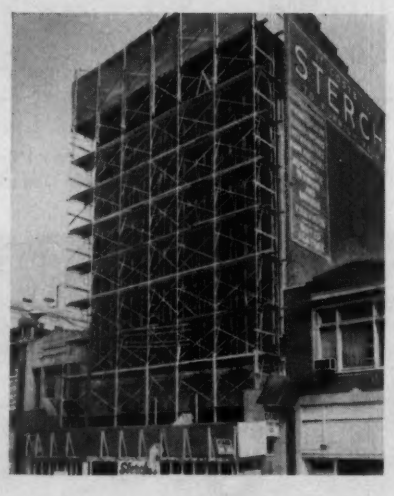
RUBBLE DELIVERY—Hand-filled with rubble, wheelbarrows are hoisted to scaffolds where rock is distributed alongside forms.

Scaffolding and Shoring Methods . . . by PSC



19-Story double hoist tower . . .

For fast lifting of materials during construction of Mercy Hospital, Baltimore, Consolidated Eng. Co., contractor, uses this 39-section, 253-ft. 6-in. high "Gold Medal"® Double Hoist Tower. "TubeLox" Scaffolding is used to make runways to each floor.

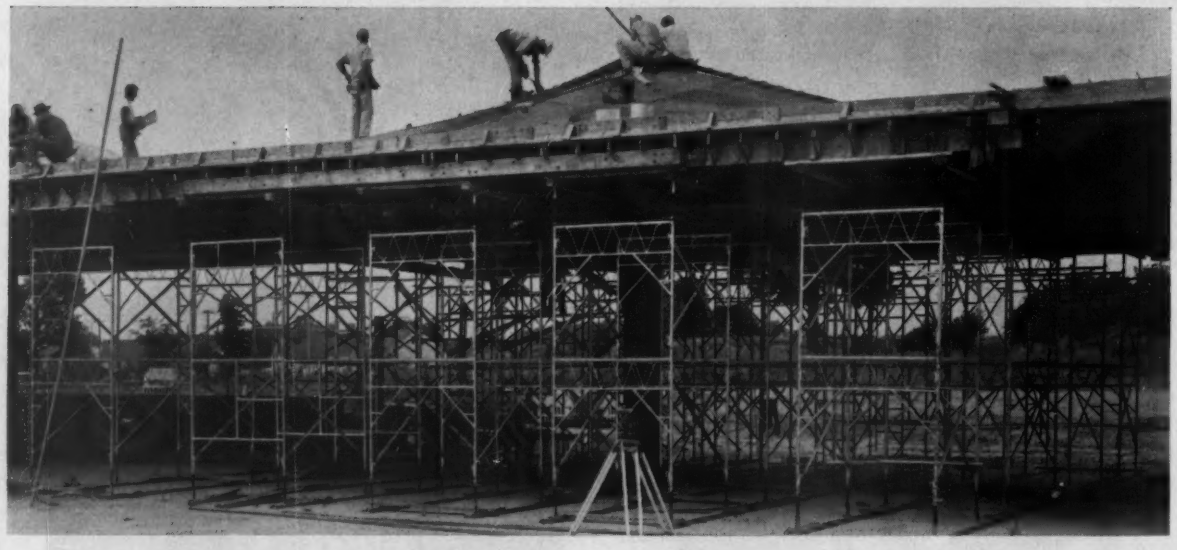


Refacing Scaffold . . .

To provide access to the entire front of Sterchi's Furniture Store, Charlotte, N. C., Foard Construction Co., contractor, uses 75 "Trouble Saver" Scaffolding frames. Planking erected on top of each row of frames provides working levels for refacing operations.

Hyperbolic paraboloid forming support . . .

This photo illustrates how easily "Trouble Saver" Shoring can be placed to support wood trusses which are used to form one of the many hyperbolic paraboloids on the new Government Employees Exchange building, Latham, N. Y. Two-frame high shoring towers, with sills attached, were slid from one paraboloid to the next.



PSC Gold Medal Scaffolding Steel Shoring

THE PATENT SCAFFOLDING CO., INC.

38-21 12th Street, Long Island City 1, N. Y. • 1550 Dayton Street, Chicago 22 • 6931 Stanford Avenue, Los Angeles 1
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Circle 110 on Reader Service Card

new... Motorola MOTRAC radio with EXTENDER operation

✱ CUTS OUT IGNITION NOISES

Dramatically Improves Overall Efficiency In 24-50 mc 2-Way Radio Systems

Motorola MOTRAC radio with Extender operation puts ignition noise suppression where it does the most good—built right into the receiver. Here it suppresses ignition noises from your own vehicle as well as those in the vicinity... providing the answer to the biggest problem in low-band 2-way radio systems today.

First and foremost, Extender operation improves reception throughout your system. In as much as ⅘'s of your territory, ignition noises can garble your messages. Now messages are clear. "Hash" caused by ignition noise is gone. *Second*, you can "extend" useable operating range where ignition noises are high. Motorola Extender operation suppresses disrupting ignition noise on weak, fringe area signals allowing the message to come through clearly—right out to the limits of your radio coverage. *Third*, you can reduce interference from other radio systems (extraneous messages, ringing and other noise interference known as intermodulation)... just flip the switch on the control head.

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START IT PAYING FOR ITSELF AND
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Heller arrangements are sensible and flexible, and "Pay-As-You-Earn" is one of many optional variations. Find out how Heller's quick, informal financing service and practical point of view may help you these days when every dollar counts.

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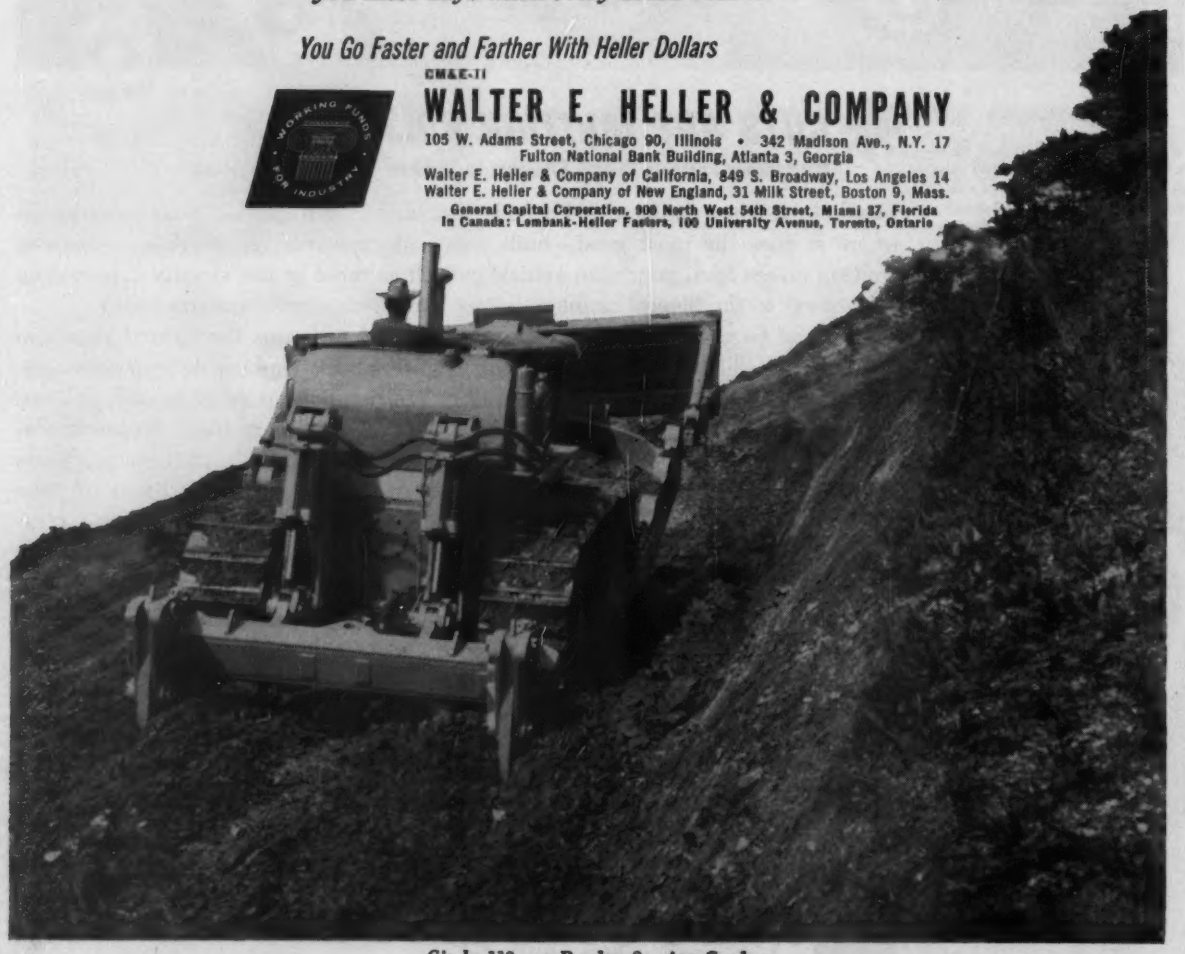

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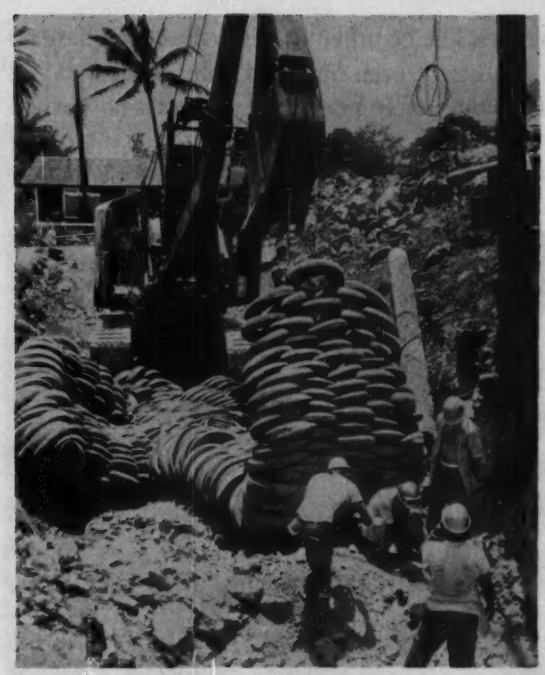

PROTECTIVE COVER—After blastholes are loaded a Northwest 25 backhoe positions a rubber tire mat over the blast area to keep down the shot rock. Old tires were collected from all over the Island of Oahu and assembled at the site by Morrison-Knudsen.

Tires Serve As Blasting Mats

In a rock cut for a freeway in Honolulu, flexible mats made of old tires hold down shot rock. A seismograph helps plan the shots.

continued on page 115

MAT MAKERS—Workmen thread tires onto parallel 1-in. steel pipes anchored to a 12x12-in. timber that serves as a stop. When all tires are laced together, a ½-in. wire rope is pulled through the laced tires, and the pipes are removed to make flexible mat.

the SWENCH® is a wrench like no other — and will work where no other can. It's the world's first manual impact wrench. Loosens frozen nuts and bolts in seconds . . . tightens with precise accuracy every time. SWENCH is completely portable . . . needs no outside power — yet multiplies torque many times. It safely handles more bolt sizes than any comparable power wrench, but costs less. Read how you'll save with the SWENCH:

SWENCH® speeds repair jobs for trucking firm

In every truck servicing garage, like one operated by a big mid-western trucking firm, transmission and differential repairs are common — and tough.

Removal of the nut from the differential torque divider or transmission used to take two men from 2 to 3 hours with a wrench and sledge and usually the nut was damaged beyond use.

Then, along came the SWENCH. One man — as few as 4 impacts and the nuts are off — loose in minutes instead of hours . . . undamaged. Figure what the SWENCH can save you with the same kind of performance!

The hand-operated SWENCH works anywhere — carries its power built in. Exerts many times the energy needed to pull the handle — gives you more power with greater safety — even in hard-to-reach spots.

Six models cover bolt sizes from ½" to 2½". For the full story on SWENCH, how it works, what it costs, how it saves, see you local distributor, or write:

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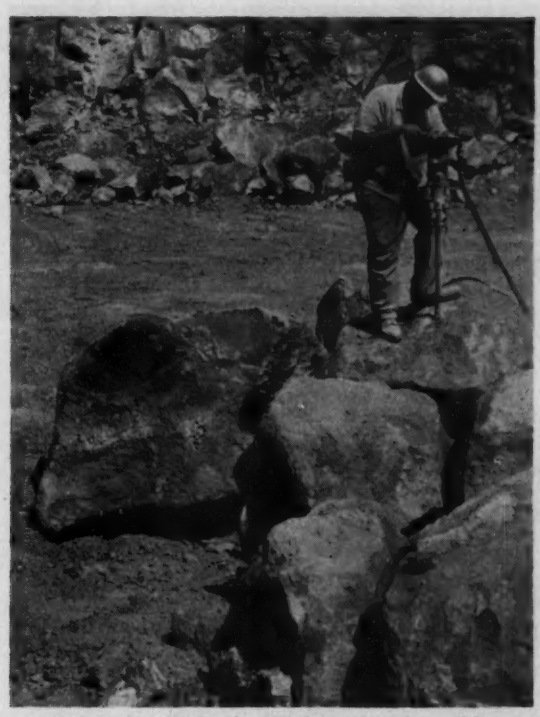
Circle 114 on Reader Service Card

TIRES SERVE AS BLASTING MATS . . . *continued*



TOO BIG TO HANDLE—Blasts are kept relatively small because of nearby buildings, and rock fragmentation is not always complete. Boulders that are too big to handle are blockholed with a pneumatic drill and shot with small dynamite charges.

HUNDREDS OF OLD TIRES laced together in a flexible mat keep down shot rock during blasting on a freeway project in Honolulu. The contractor is excavating nearly a ½ million yd of hard basalt rock and crushing it at the job site to produce fill, subbase materials, and aggregates.

Morrison-Knudsen Co., Inc., of Boise, Idaho, is the contractor on a $3.4-million section of Lunalilo Freeway that runs for 1.1 mi through a densely settled residential area. In addition to the tire mats, M-K also uses an expert seismologist to help plan the blasts to get good fragmentation with a minimum of vibration.

Used tires for the mats were gathered from all over the Island of Oahu and were assembled at the job site. The tires were threaded onto 1-in. pipes anchored at one end atop a 12x12 timber that serves as a stop. After all tires in a mat were laced together, workmen pulled ½-in. wire ropes through the tires and fastened the rope ends with cable clips. The pipes then were removed.

These mats are placed over the blast area just before detonating each shot. Either a Cat D8 dozer or a Northwest 25 backhoe move the tire mats.

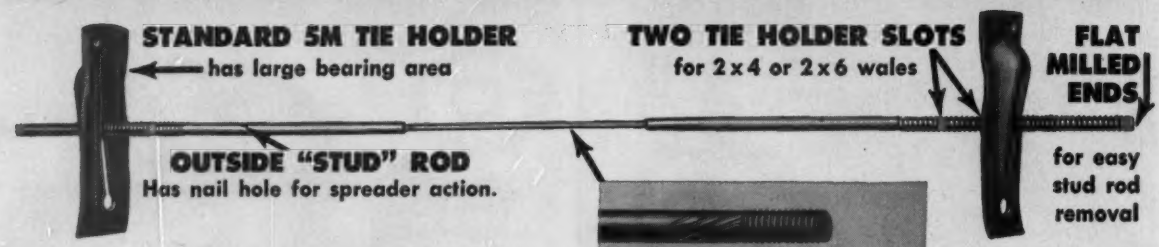
Sometimes the blasting is a two-part operation. The hard basalt requires powerful dynamite charges, but blasts must be kept small because of nearby buildings. Because not all rock is broken sufficiently in the first blast, big boulders are blasted individually after usable rock is removed.

continued on page 117

SUPERIOR'S NEW COMPACT, ECONOMICAL FORM TIE

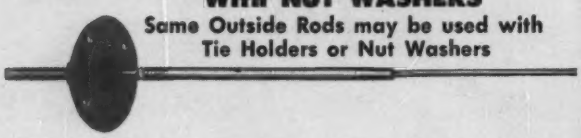
"SUPERTIE" Assembly

with Tie Holders or Nut Washers

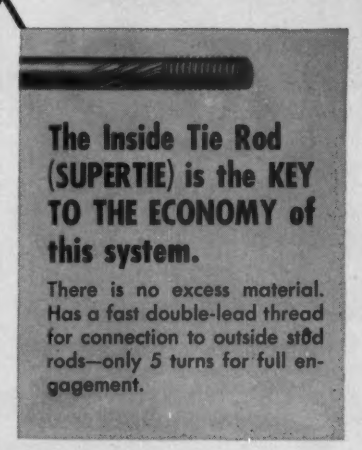


With NUT WASHERS

Same Outside Rods may be used with Tie Holders or Nut Washers



The Superior SUPERTIE Assembly consists of two outside rods, two standard 5M tie holders, or two nut washers. Together with the high-strength Inside Tie Rod (SUPERTIE), this compact assembly offers great economy and versatility over conventional tieing systems. The Outside Rod will accommodate either tie holders or nut washers on 2 x 4 or 2 x 6 wales. For easy removal the ends of the Outside Rod are flattened. Another feature, the nail hole, provides for fast and convenient form spreader action. Only the SUPERTIE, left in the concrete, is lost . . . the working parts of the assembly are reused again and again.



The Inside Tie Rod (SUPERTIE) is the KEY TO THE ECONOMY of this system.

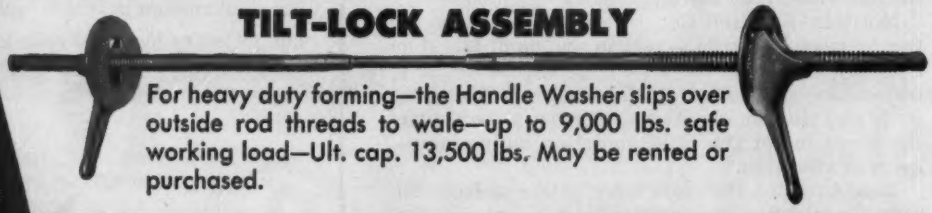
There is no excess material. Has a fast double-lead thread for connection to outside stud rods—only 5 turns for full engagement.

Rented With Option to Purchase

This tie system has been designed for compactness, all excess weight and bulk have been eliminated, yet it has a Safe Working Load of 5,000 lbs. (7,000 lb. ultimate capacity.) *Write for Bulletin SA-1.*

SUPERIOR Heavy Duty Form Tie Assemblies

TILT-LOCK ASSEMBLY



For heavy duty forming—the Handle Washer slips over outside rod threads to wale—up to 9,000 lbs. safe working load—Ult. cap. 13,500 lbs. May be rented or purchased.

NUT WASHER ASSEMBLY

For contractors that prefer a spun washer. A heavy duty type—capacities are the same as Tilt-Lock Assembly above. Also rented or purchased.

SUPERIOR Concrete Accessories, Inc.

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Houston Office
4101 San Jacinto, Houston 4, Tex.

Pacific Coast Office and Plant
2100 Williams St., San Leandro, Calif.

Circle 116 on Reader Service Card

TRUCK FEEDER—Northwest 80D shovel with 3-yd bucket loads 18 yd of earth and shot rock into Peterbilt tractor trailer that hauls it to area and trench fills. A pair of shovels handle all excavation, and each keeps five trucks busy hauling the dirt.

To get to the rock, M-K first removed 2 to 6 ft of overburden and hauled it away for use as fill. A Cat D8 tractor with an Ateco ripper loosened the dirt, and Cat D8 dozers and a Michigan 375A tractor shovel with a 6-yd bucket pushed it toward shovels for loading into trucks.

Two Gardner-Denver Air-Trac drills powered by a 900-cfm Ingersoll-Rand compressor take care of blasthole drilling. Hole depths range from 8 to 40 ft and hole diameters are 2 and 3 in. Blast patterns vary from 6x6 to 10x15, with anywhere from 6 to 45 holes per shot. Ammonium nitrate and Atlas millisecond blasting caps are used.

After the holes for a shot are loaded, M-K's seismologist moves his instruments into position on a line between the blast center and the nearest structure. The instruments check ground vibrations caused by the blasts. Vibrations vary from place to place because the inconsistent rock formations have differing ground transmission characteristics.

After each blast is fired the seismograph film is taken out of the Leet instrument and immediately processed in a field darkroom. In 10 min a record of the blast is ready for analysis and for planning subsequent shots.

Morrison-Knudsen keeps a permanent record of the location, amount of explosives, delays, and number and depth of holes for each shot. This record gives the contractor a quick day-to-day check on the progress of the work and enables

TIRES SERVE AS BLASTING MATS . . . *continued*

him to plan the shots to get the best fragmentation with a minimum of concussion and vibration.

Earth from the excavation was used as fill material to reclaim land at the edge of Pearl Harbor. Later, Morrison-Knudsen erected a secondary crushing plant on this site.

Shot rock from the project is run through a primary crusher that produces materials suitable for trench and area fills without further processing. The +6-in. fraction of this material is run through a secondary crusher to produce aggregates.

In the excavation, a Bucyrus-Erie 71B shovel and a Northwest 80D, both with 3-yd buckets, load overburden and shot rock into trucks. On long hauls for the area fill, M-K uses a fleet of Autocar and Peterbilt tractors with 18-yd trailer bodies. Euclid rear dumps take care of short hauls to the primary crusher.

Big boulders that the shovels can't handle are moved aside and broken into smaller pieces. This is done by blockholing them with rock drills and blasting them with small charges of dynamite.

The Euclid dump trucks ride up a ramp and dump the rock onto a 48-in.-wide apron conveyor that feeds a 42x48-in. Telsmith jaw crusher. From here a conveyor takes the crushed rock to a 5x10-ft rod deck screen where all −1½-in. material is removed. It is dumped onto a conveyor that feeds a two-compartment Wescon hopper. Here the rock is separated further into two fractions.

On one side of the hopper a conveyor loads material ranging in size from −1½ in. to No. 4 into trucks that haul it back to the job for use as trench fill. A conveyor on the other side of the hopper handles No. 4 material that is used for area fill.

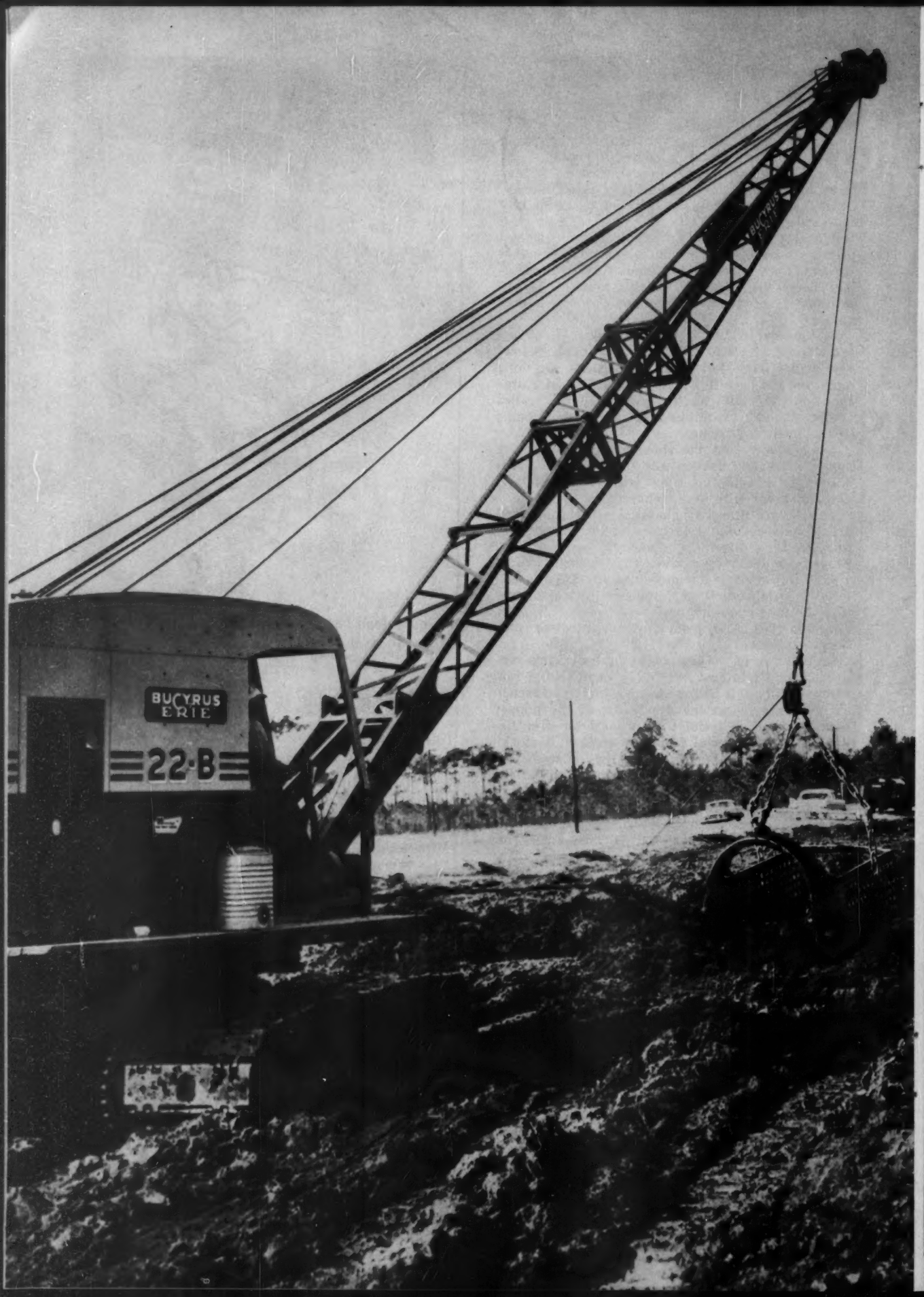
All +6-in. material from the crusher is stockpiled nearby for later processing in the secondary crusher. A local trucking firm, American Trucking Co., hauls this material over the ½-mi distance with a fleet of Kenworth tandem-axle diesels that carry 15 yd each per trip. Crushed rock from the secondary plant is processed to meet specs for subbase materials, concrete aggregates, and bituminous pavement aggregates that are stored at the plant site.

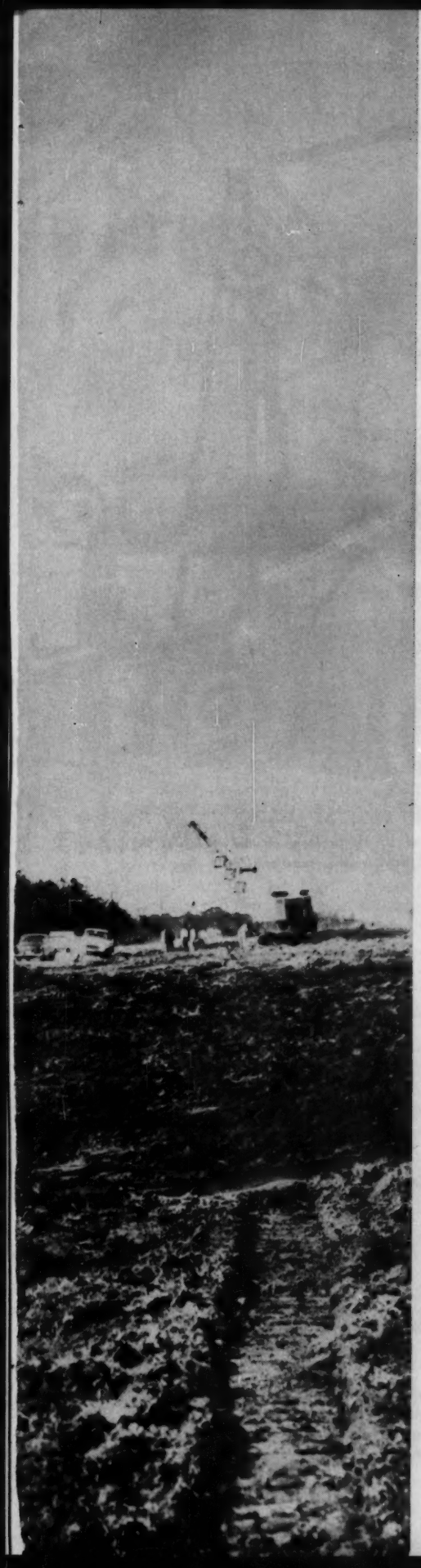
All components of both crushing plants are powered electrically. Commercial power is distributed throughout each plant from a special electrical van equipped with the necessary controls and switches. Each plant has a capacity of 400 tph.

When delays occur because rock gets jammed in a crusher, M-K dislodges it with an Ingersoll-Rand pavement breaker. It is powered by a 125-cfm Worthington compressor stationed near the crusher.

Men on the Job

In charge of the project for Morrison-Knudsen Co., Inc., is Fred V. Swanson. Excavation superintendent is Bruce Shumway, and drilling and blasting superintendent is Frank Sganga. The seismologist is Mark Stein. Project engineer for the Hawaii Div. of Highways is Stanley Fujiyama, and assistant project engineer is Frederick Takakawa.


BUCYRUS
ERIE
22-B



TIGER ON THE SPOT AT MOBILE'S WRAGG SWAMP

USS Tiger Brand Wire Rope withstands biting sand and muck digging drainage canal

Land that was once a swamp will soon be used for housing developments and golf courses in Mobile, Alabama. An estimated 900,000 cubic yards of muck, sand and clay were gouged out of Wragg Swamp to create a new $1,400,000 drainage canal five miles long.

Here at work are some of the draglines and pile drivers . . . all are rigged with tough, rugged USS Tiger Brand Wire Rope. This job really puts wire rope on the spot. Dragged through biting sand, soaked in water, subjected to sudden shock loads, it takes a terrific beating. That's why sub-contractors Bernard & Byrd rely on USS Tiger Brand—America's No. 1 Wire Rope—for low wire rope costs.

USS Tiger Brand Wire Rope is a top-quality product. Specified standards are maintained for every step of production. Plant facilities are unsurpassed in the industry. These facilities, along with one of the finest staffs of wire rope engineers in the country, assure wire rope with complete dependability, long service life and maximum economy.

Whatever the equipment—whatever the purpose—you'll find a USS Tiger Brand Wire Rope designed to meet your most exacting needs. And there's a Tiger Brand Field Service Representative near you to help you make the best selections. Call your local Tiger Brand Distributor for information or write American Steel and Wire, Dept. 1458, Rockefeller Building, Cleveland 13, Ohio. *USS and Tiger Brand are registered trademarks*

USS Tiger Brand Wire Rope resists shock and impact loads on this pile driver.

◀ Sand and muck combination creates a severe abrasion problem. USS Tiger Brand Wire Rope takes this rough service in its stride and provides greater operating economy.

Section of Wragg Canal designed to handle 6,500 cubic feet of water per second. Five machines are shown digging this canal—all rigged with USS Tiger Brand Wire Rope. Engineers: J. B. Converse & Company. Prime Contractors: Laidlaw Contracting Co., Flaco Corp. and M. C. Farmer. Subcontractor: Bernard & Byrd.

American Steel and Wire
Division of
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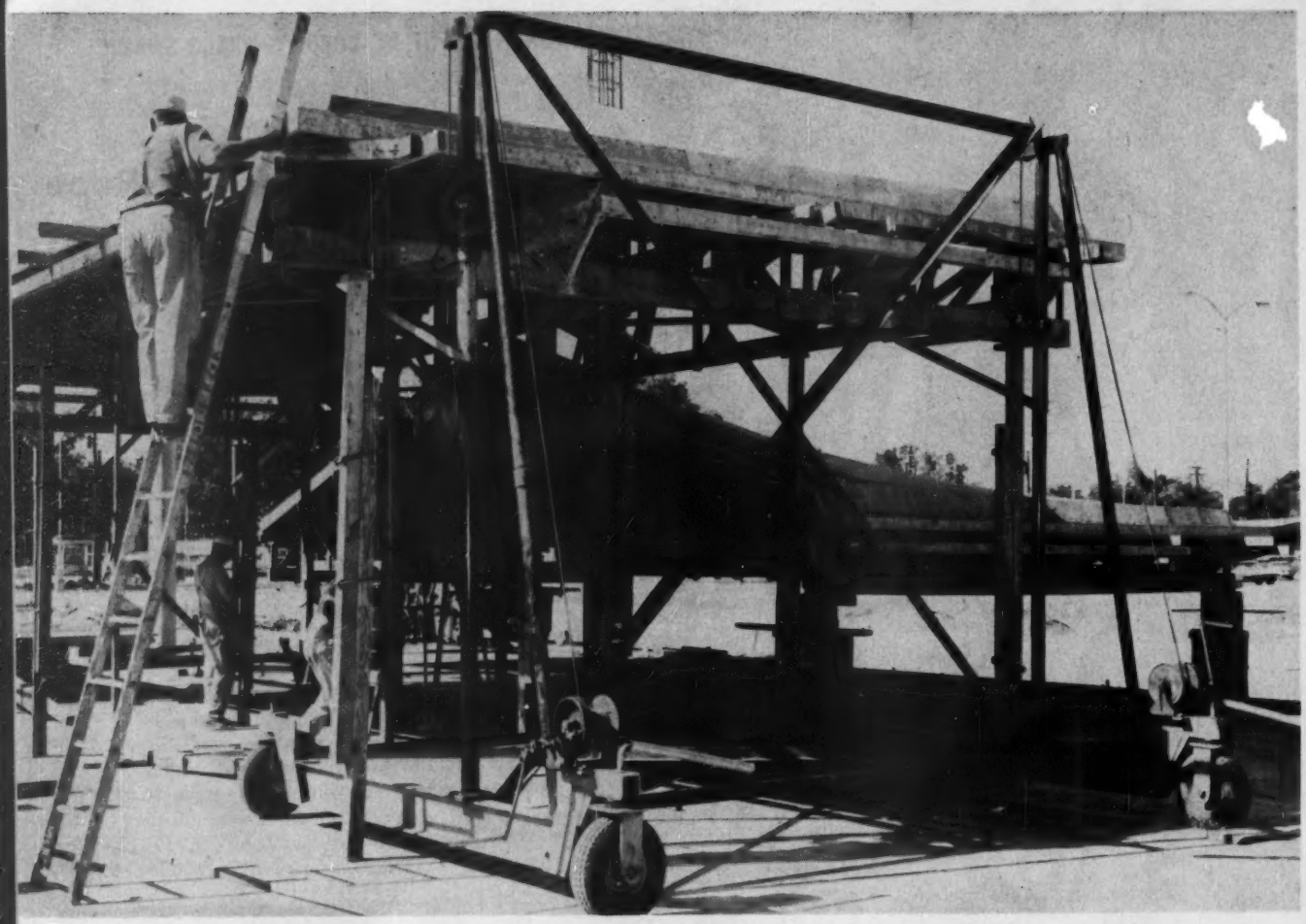
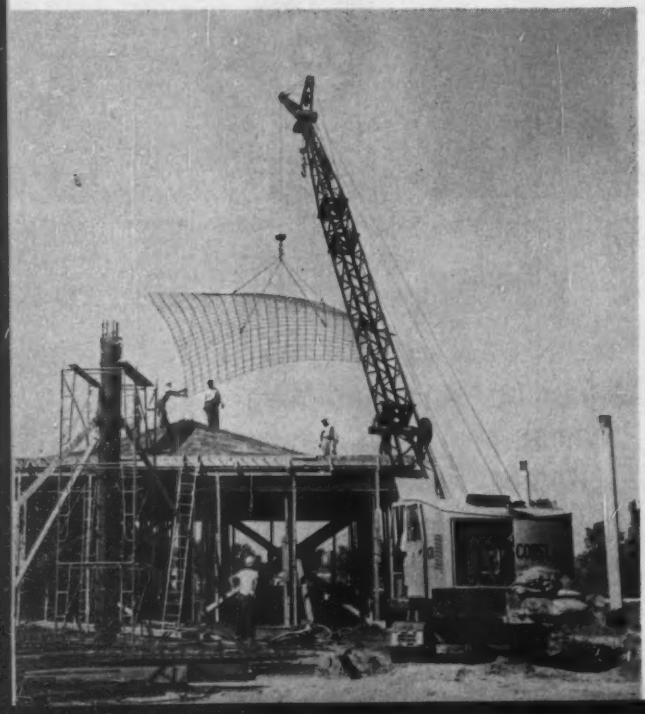
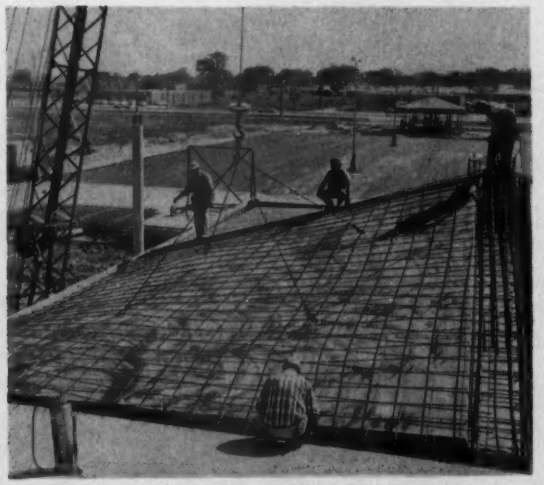
This mark tells you a product is made of modern, dependable Steel.



FORMS—A pair of travelers moves a form section into position and then holds it at the correct elevation until timber shoreholds the form sections and hand winches raise and lower them.

Reinforcing Placed in Sheets





STEEL—Above, Lorain crane places 20x20-ft preassembled rebar mat that covers a quarter of an umbrella. Later adjacent mats are tied together with dowels placed across ridge beam steel. Left, shop-built column form for next roof shell is in place.

Preassembled Reinforcing Speeds Work on Umbrella Roof

PREASSEMBLED REINFORCING and movable forms that can be repaired easily enabled a Des Moines, Iowa, contractor to build 62 hyperbolic paraboloid roof shells for a shopping center on a mass-production basis.

The umbrella-type roof and the movable forms are not new, but Caldbeck Construction Co. refined the techniques for erecting this type of structure to save time and materials.

Reinforcing for umbrella shells usually is tied in place. But Caldbeck preassembles the steel and places it in large sections to reduce the cycle time between pours. This also utilizes the ironworker's time better because the crews can tie steel on the ground even when forms are not in place to receive reinforcing.

The umbrella shells are of two sizes. Nine are 46x50 ft, and 53 are 40x41 ft. All are 4 in. thick and contain ½-in.-dia rebars on 10-in. centers in two directions. Bar dia in edge beams is 1 in. and in ridge beams 1¼ in.

Reinforcing for ridge and edge beams is tied into bundles that are placed in one piece for each beam. At the peak of the umbrella Caldbeck places a rebar spider, a cross-shaped assembly of reinforcing that fits the intersection of the ridge beams atop the column.

Shell reinforcing is placed in four mats, each covering a quarter of an umbrella. These mats follow the beam steel and are tied together with dowels placed across the ridge beam reinforcing.

A Lorain crawler crane with a 65-ft boom and 10-ft jib places all reinforcing. The crane also takes care of concreting the shells and columns with a ½-yd bucket.

Concrete is an eight-sack mix with a design strength of 3,200 psi and a slump of 4 in. It is dumped right on the forms and spread by hand shovelling. To insure good distribution and avoid excessive slumping, Caldbeck places concrete in 6 to 8-ft-wide strips starting at one edge of the shell. Sections of steel pipe placed on top of the reinforcing mark the edges of the strips.

It takes about 2½ hr to place the 24 yd of concrete in one of the small shells. For the large shells it takes about 3½ hr to pour 33¼ yd of concrete. Completed shells must cure for at least 48 hr before forms can be stripped.

Stripping and moving the forms takes about 4 hr for one shell. A set of forms consists of two halves, each weighing about 5 tons. A pair of shop-built travelers moves each form section.

Each traveler includes a vertical frame, lifting arms, and a pair of hand-operated winches. Cables

CONCRETE—Concreting crew swings ½-yd bucket to reach far side of roof shell and distributes the mix by shoveling. A vibrator and finisher then work the concrete. To keep the high-slump mix from flowing down the forms, the contractor covers the shell by placing concrete in 6 to 8-ft-wide strips marked by pipe placed on top of the steel.

AT EDGE OF SHELL—After placing rebar mats for the roof shell, an ironworker adds dowels that will tie this shell to the next one. The dowels are inserted in holes drilled in removable planks that form the sides of the edge beams along the shell.

from the winches pass over the top of the frame and are attached to the lifting arms which ride on vertical pipe supports that are part of the frame. The entire assembly rides on four rubber-tired wheels.

Normally, the roof shells are poured after the floor is completed, and the travelers can be moved easily. Where forms must be moved over rough ground, the contractor sometimes uses a crane. It lifts one end of the form and pulls it to its new position while the other end rests on the traveler.

Caldbeck built one set of forms for the nine 46x50-ft umbrellas and four sets for the 40x41-ft umbrellas. Each form section consists of three trusses with 2x6 rafters on 16-in. centers covered with plywood.

Unlike other umbrella forms of this type, Caldbeck's have inclined trusses and a two-layer plywood surface.

Instead of positioning the trusses vertically, Caldbeck inclined them so that they are perpendicular to the form surface. This reduces the amount of cutting and fitting necessary during form construction.

The ¾-in.-thick plywood surface consists of two layers of plywood instead of one solid one. The form framework is covered with ½-in. plywood that is overlaid with ¼-in. plywood. This two-layer construction makes it relatively easy to repair the forms, which are reused up to eight times and sometimes become damaged.

continued on page 127

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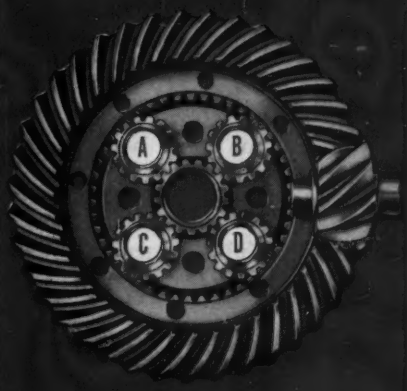

2½ TIMES MORE TOOTH CONTACT AREA
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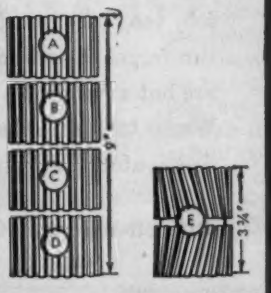

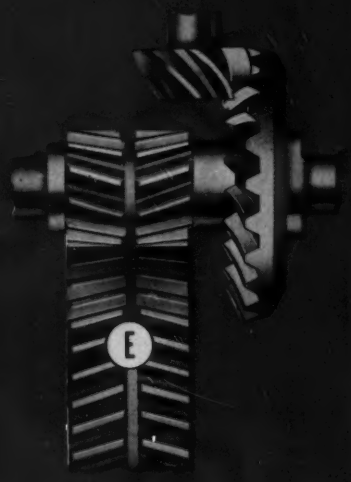

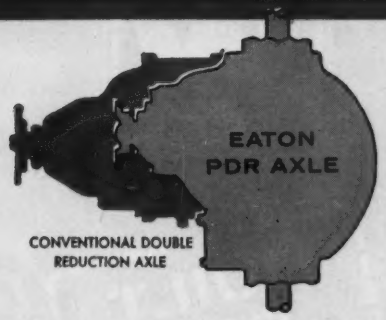

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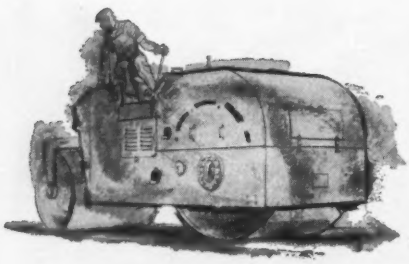

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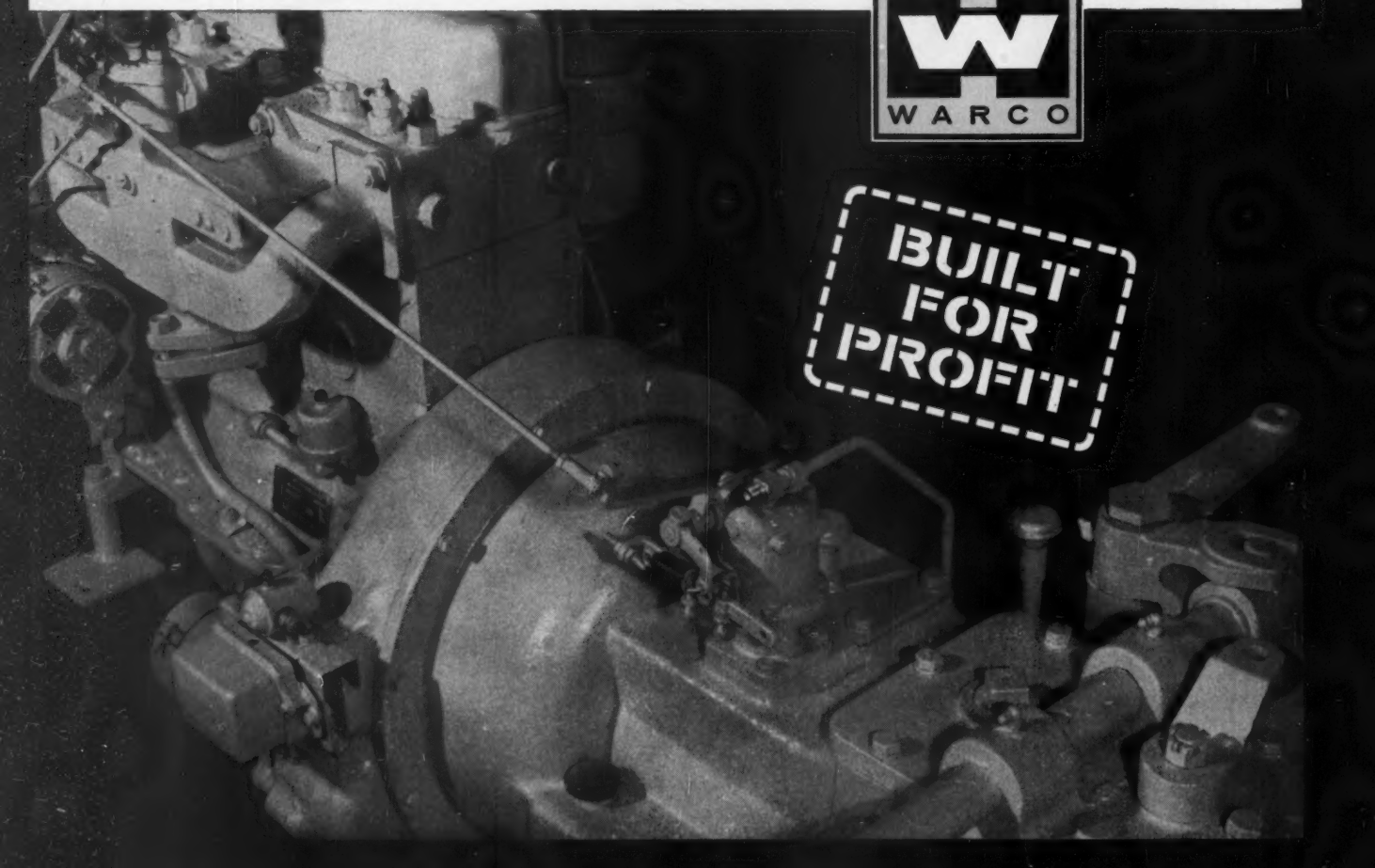
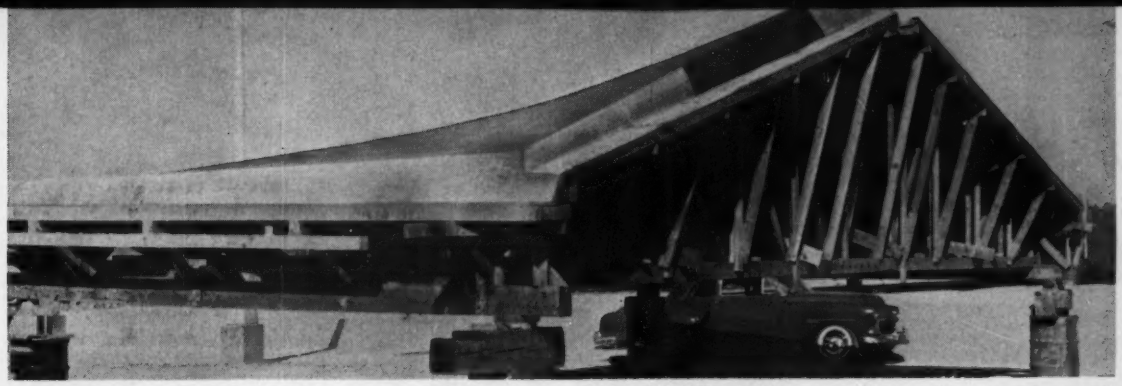




PATCHWORK FORM—Damaged form surface is easy to repair because only the surface layer of ½-in. plywood must be replaced.

UMBRELLA ROOF . . . *continued*

To repair the surface, Caldbeck simply rips off the damage portion of ¼-in. plywood and replaces it with a new sheet. This makes repairs cheaper because only a thin sheet of plywood is needed. It also makes them faster because the carpenters don't have to worry about keeping the forms from twisting, since the ½-in. layer of plywood maintains the proper shape.

In position, the forms are 14 ft above ground. The travelers move a form into place and raise it approximately to that height. Then Caldbeck positions adjustable steel shores under the form and moves the travelers out of the way.

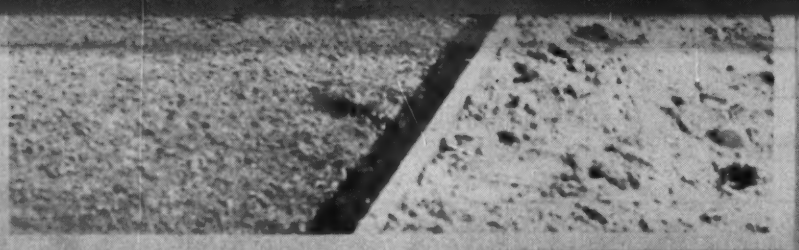
The shores are adjusted until the form is at its correct elevation. Then the contractor adds 4x4 timber shores to carry the weight of the concrete.

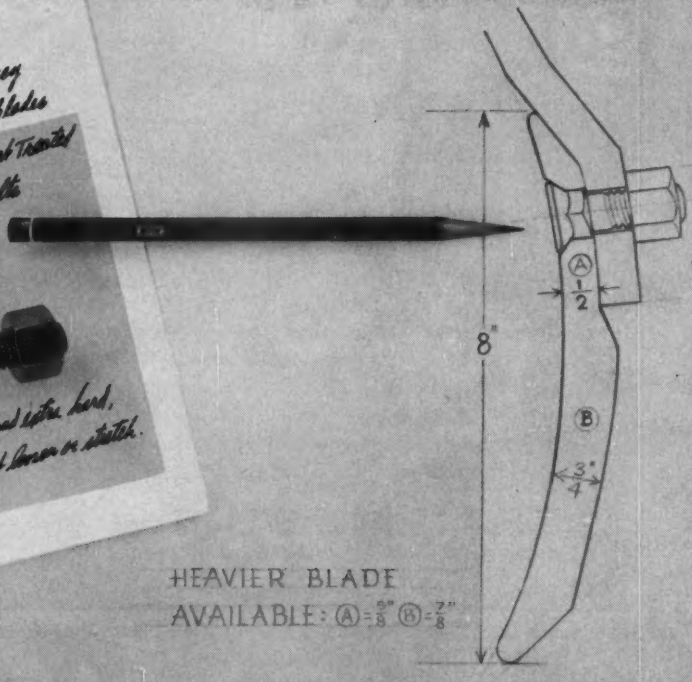
To keep the forms from twisting while they are moved and jacked into place, Caldbeck adds 2x8 timber support girders under the trusses and at right angles to them. The girders carry the weight of the forms.

After steel and concrete are placed, the travelers are wheeled into position and the form is simply lowered away from the shell. No lateral support for the shells is necessary. They rest on 21-ft-high 18-in.-dia concrete columns.

Columns are poured in steel forms fabricated in the contractor's shop. Because Caldbeck felt that purchasing column forms would be too costly, he made his own from 18-in.-ID steel pipe. The pipe was cut longitudinally and lugs were added for bolting the two halves together. Total cost for two sets of column forms was only about $300.

Work on this project was started in June and is scheduled for completion this month. Superintendent for Caldbeck Construction Co. is Frank Miller.





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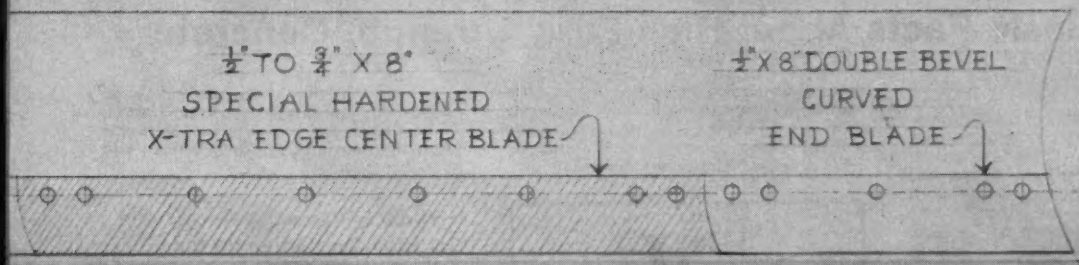

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The hardened X-Tra Edge center section is self-sharpening and cuts off the high spots instead of riding over them. In addition to straighter grading and longer working life you reduce blade waste, bolt cost and expensive replacement downtime. County Highway officials and contractors say "After a year's use, Pacal Blades have saved 40% to 50% in blade and bolt costs".

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CIRCULAR 883

ALPHA

BETTER CONSTRUCTION THROUGH BETTER USE OF CEMENTS

news and notes from the field

Some Basic Facts About High-Early Strength Concrete

What It Is

The simplest explanation of what is generally called "high-early strength" in concrete is a comparison of the strength of concrete made with Hi-Early (Type III) cement to that of concrete made with Regular (Type I) cement. Approximate relative strengths are shown in the table below. One point that should be kept in mind in such a comparison is that *compressive strength is not always the best measurement of concrete quality*. For instance, the highest strength concrete is not always the most durable. Many other factors also have to be considered although strength is the most commonly used yardstick for job-site quality control.

Relative Strengths of Concrete Made From Hi-Early (Type III) and Regular (Type I) Cements

	Compressive Strength	
	3 Days	28 Days
Regular Cement (Type I)	100%	100%
Hi-Early Strength Cement (Type III)	190%	130%

(Above comparisons do not apply when steam curing is employed)

Tabulation courtesy of "Guide to Better Field Practice", Concrete Construction.

In this tabulation the strength of concrete made with Regular (Type I) cement was used as 100%. It can easily be seen how concrete made with Hi-Early cement gains strength rapidly in the early stages, and how this advantage wanes in the later stages.

When to Use High-Early Strength Concrete

This decision is usually made on the basis of economics. High-early strength concrete is generally used where high strengths at early ages are necessary. Since the production of high-early strength concrete is more expensive, its convenience must offset the additional cost. The factors that determine whether high-early strength concrete is needed or desirable are usually early stripping of forms, early *use* of concrete such as heavily traveled pavements or floors and the necessity for shorter curing periods during cold weather to develop strength to resist freezing at early ages. High-early strength concrete can be produced by using Hi-Early cement or by increasing the cement factor if regular cement is used—more about this later.

For emergency jobs to provide fewer interruptions during remodeling or repairs, high-early strength concrete is often specified.

Earlier form removal is one advantage of using high-early strength concrete.

Why Hi-Early Cement Costs More

Two of the most expensive operations in the production of cement are the burning and preparation of clinker and the grinding of the clinker into finished cement. Both of these operations are more expensive in the production of Hi-Early cement plus additional costs in changing raw material proportions and raw material preparation. These factors account for the increased production costs of Hi-Early cement and its higher price.

When low temperatures are expected at early ages, high-early strength concrete shortens the period of curing and possible freezing damage.

Is Hi-Early Cement Necessary to Get High-Early Strength Concrete?

When a limited amount of high-early strength concrete is needed, it may prove expensive for a concrete producer to stock Hi-Early (Type III) cement for the job. In such a case, he might consider using larger quantities of Regular (Type I) cement to obtain the necessary early strength.

In this event, advance tests of the materials to be used in the job should be made to determine how much cement per yard will be required. To give approximations of what to expect, Alpha's research men did some preliminary testing for comparison. (Several brands of cement were used.) These are the "rules of thumb" resulting from the tests:

1. In general, the strength of relatively *lean* 5 sacks per yard Type III cement concrete can be duplicated at *1 and 3* days by using Type I cement if the cement factor is increased 2 sacks per yard to a 7-sack mix.
2. The strength of *richer*—6 sacks or more—Type III cement mixes can be duplicated at *1 and 3* days with Type I cement by increasing the cement factor by about 2½ sacks per yard to an 8½-sack mix.
3. At 7 days, the strength advantage of Type III concrete becomes less than at earlier ages. To maintain equal strengths of the concrete at 7 days, the cement factor for Type I cement would have to be increased by about 1½ sacks per yard over that of Type III cement.

It can thus be seen that it is easier to duplicate Hi-Early cement concrete strength at 7 days than at the earlier 1 and 3 days.

When Hi-Early cement is used for concrete products (block, precast beams, etc.) there are many other variables to be considered such as aggregates, steam curing and others. Alpha Field Engineers are equipped and ready to help users of our cements achieve maximum efficiency from any application of portland cements.

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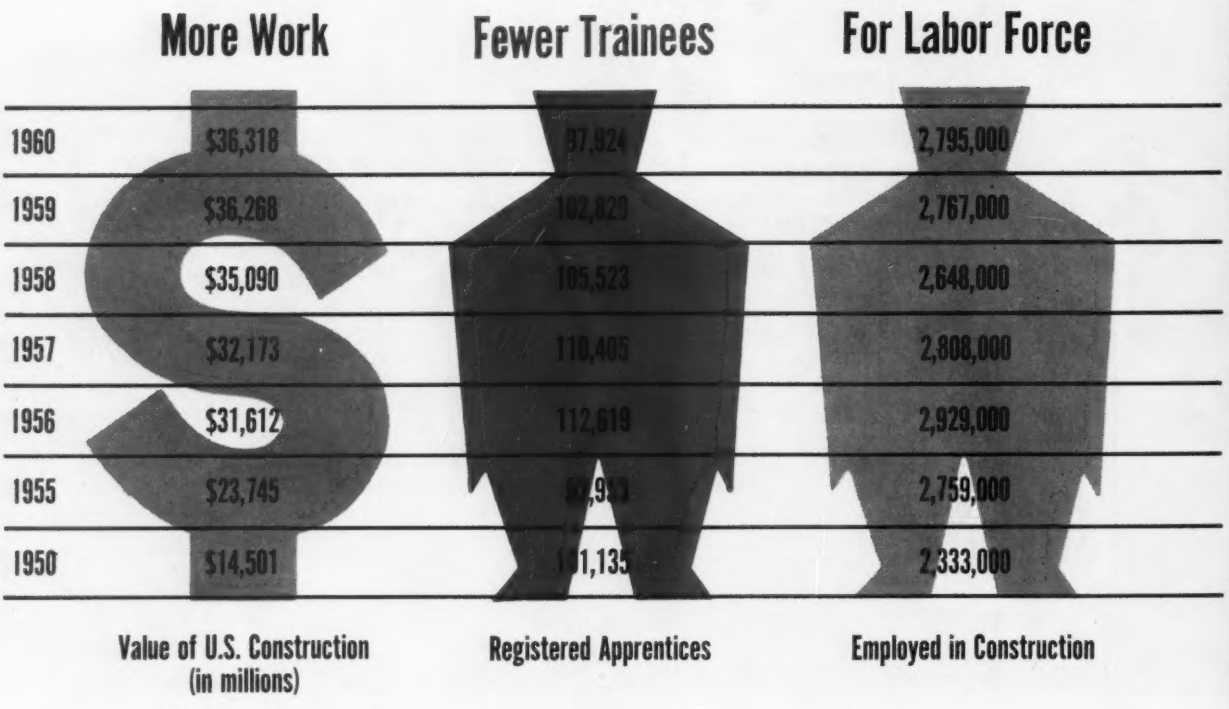
Circle **131** *on Reader Service Card*

By JOHN MONAGHAN
Assistant Editor

"Bluntly speaking, the people responsible in management and labor for these (apprentice) programs—the people who should be most concerned about an adequate supply of skilled people—are woefully lacking in meeting their responsibility."
—Jerry Holleman, Asst. Secy. of Labor

Apprenticeship:



THE CONSTRUCTION INDUSTRY is expected to take giant steps in the sixties, but it has an Achilles' heel that might seriously impair, if not cripple, its progress.

Scientific advances including new equipment and materials, a booming population, and greater outlays for public works will be factors in a 40 to 50% increase in construction volume by 1970.

But properly trained skilled craftsmen to do the work will be at an all-time premium.

By 1970, an additional 2,300,000 skilled workers will be needed in the building trades to meet normal attrition and a bigger market says the U.S. Department of Labor's Bureau of Apprenticeship and Training. At the present rate of training, only 10% of these craftsmen will have learned their trade in formal apprenticeship training programs.

The rest will become journeymen "after working at various unskilled jobs and occasionally observing the work of skilled craftsmen," says Edward E. Goshen, director of the BAT. "This is expensive and undesirable to both employer and employee."

Just how expensive a shortage of capable craftsmen can be already is being felt by some contractors who now are paying journeyman wages for sub-standard work. Los Angeles contractors report that so far they have found no shortage of journeymen in their area. "But there's a shortage of good ones."

"Even when there is an over-all problem of unemployment," a San Francisco contractor points out, "there can be a lack of skilled labor of the particular caliber you're looking for. The degree of knowledge and performance of the worker is not up to the standard that could be reached."

In some areas, qualified journeymen command wages above scale, especially during peak periods. A Seattle builder points to the present situation in

A Vital Well That's Running Dry

% DROPOUTS in Apprentice Training Programs

TRADE	1956	1957	1958	1959	1960	TOTAL
All Trades	52.1	56.3	48.3	48.0	51.2	51.3
Roofer	78.9	71.4	80.2	71.1	79.3	77.6
Carpenter	66.9	66.0	62.4	60.7	69.4	64.7
Painter	66.0	62.3	64.5	62.1	63.0	63.5
Sheet Metal Worker	51.7	52.8	49.8	45.6	38.8	48.8
Electrician	41.1	57.4	43.0	42.7	39.3	46.8
Structural Iron Worker	36.5	34.4	41.2	45.7	50.7	45.1
Lather	59.8	43.6	35.3	42.7	46.4	44.2
Plumber, Pipefitter	42.7	48.1	38.1	40.2	41.6	42.5
Glazier	43.0	50.7	37.3	32.0	29.1	39.9
Cement Mason	34.8	43.9	31.7	42.5	42.8	39.4
Plasterer	36.1	47.6	40.0	35.2	33.7	39.1
Brick, Stone, Tile	33.7	42.2	30.6	30.4	40.2	34.7

his area, where "a skilled finish carpenter can draw a wage considerably above scale."

There is no way of knowing the number of improperly trained workers contractors are forced to hire. But a government survey of formal apprenticeship programs alone showed that in 1960 over 4,000 apprentices quit training programs because they had an opportunity—born of the contractor's desperation—to earn journeyman wages.

But the present situation is just a symptom of the critical skilled labor shortage contractors can expect by the end of the decade. While many contractors are skeptical of government figures of future manpower needs—productivity is expected to limit this increase—few disagree with Department of Labor statistics on attrition.

In the next 10 yr the building trades will lose an average of 100,000 skilled craftsmen a year because of deaths, retirement, and occupational shifts. Meanwhile, present training efforts are producing less than 40,000 apprenticeship completions a year, and this total has been declining since 1956.

Not only will more skilled workers be needed, but the craftsman of the future will require more skill and flexibility to do the highly technical and diversified jobs expected of him. Revolutionary changes in techniques, equipment, and materials are anticipated in all the trades. This means that the demand for workers with sound basic educations and ability also is mounting. But fewer capable high school graduates are entering the trades.

Industry leaders and government spokesmen agree that the solution to the problem lies in more and better training through joint apprenticeship committees. Yet, since 1956 when 112,619 apprentices were registered in construction trades training, the number has dropped steadily to the present.

Although both contractors and union officials speak in glowing terms of the joint apprenticeship committees, their critics—and the statistics—indicate that both management and labor are paying little more than lip service to formal training.

Assistant Secretary of Labor Jerry Holleman puts it this way: "Bluntly speaking, the people responsible in management and labor for these programs—the people who should be most concerned about an adequate supply of skilled people—are woefully lacking in meeting their responsibility."

Contractors and union people, in the spirit of their traditions, often are quick to place blame. "Union oldtimers have a tendency to fear and hold back younger men," says an Atlanta builder, but he adds: "Contractors doubtless throw stumbling blocks in the way of training programs, too."

Many contractors recognize the joint responsibility of labor and management. "The fault lies with both them and us," admits a Dallas builder. "We have to improve both communication and education."

It generally is recognized by both management and labor that not enough joint apprenticeship committees are in operation—many localities with a large labor force have none at all. Present programs do not come close to providing the journeymen they might train.

The problem of getting an adequate supply of craftsmen out of these joint apprenticeship committees to meet the industry's future needs is traceable directly to the type of young men who apply.

continued on next page

"We get calls from high school counsellors asking to sign up some kid who is flunking all his courses . . . We don't want just any high school graduate, we want the smartest ones."

In Key Trades, Apprentice Training Lags or Declines

	1950	1955	1956	1957	1958	1959	1960	1961*
Carpenters	32,120	26,248	26,712	26,306	23,977	23,623	22,007	21,579
Electricians	15,787	17,022	18,679	17,349	17,636	17,345	18,288	17,830
Painters, Paperhangers	5,655	4,610	4,904	4,785	4,747	4,854	5,016	5,017
Plumbers, Pipefitters	22,253	21,637	22,398	22,982	22,106	21,812	20,223	20,222
Trowel Trades	15,659	12,679	13,734	14,685	13,589	12,284	8,941	9,129
Sheet Metal Workers	9,661	10,757	11,841	12,011	11,258	11,149	10,688	10,183

*For June 30, projected for full year. All figures U.S. Department of Labor.

The Bureau publishes extensive literature encouraging students to stay in high school and graduate, emphasizing difficult mathematics courses as building trades background.

In a few relatively rare cases, contractors and employer associations have realized the need for educational programs directed toward high school youth and are doing something about it. The firm of Joseph L. Muscarelle, Inc., Baywood, N.J., has formed a speakers bureau of company executives to spread the word among local high schools that "modern technological research and rapidly developing engineering innovations are creating exciting career possibilities in construction."

In a unique conference administered by the General Building Contractors Association, Inc., of Philadelphia, 400 high school students and their guidance counsellors met last month to hear industry leaders describe construction opportunities. But these isolated cases, however commendable, apparently have done little to change the overall image of the construction industry in the minds of young, talented people.

The psychology of young men toward the construction industry as a way of life has changed, according to a study made by the Building Trades Employers Association of Westchester and Putnam Counties, N.Y. While new craftsmen have traditionally come from a family line of craftsmen, the young man of today does not want to work with his hands as his father did. And the father often agrees that his son should pursue a white-collar vocation—even at half the pay—for status reasons.

One of the immediate problems that alarms those aware of training deficiencies is the high rate of apprentices who do not complete their training. Less than half of those who start programs end up with a certificate of completion (*see table, p.133*).

"We get calls from high school counsellors," says a regional BAT spokesman in New York, "asking us to sign up some kid who is flunking all his courses and wants to quit school. People outside the industry just don't realize how much technology has changed the construction business. We don't want just any high school graduate, we want the smartest ones."

From 1956 to 1960, a Department of Labor report shows, 63% of painter, 65% of carpenter, and 78% of roofer apprentices dropped out of their courses. Of the 77% overall who quit voluntarily, reasons included a need for more money, distaste for the trade, and a desire for steadier work.

As an indication of what may happen in the future, 12% quit training programs before meeting minimum requirements because they had an opportunity to receive journeyman wages.

The high drop-out rate points up the need for better selection methods by joint apprenticeship committees, says BAT director Goshen. Through interviews, application forms, and a probationary period, the JAC should determine more than just the usual "past experience" information, he says. They also should seek to learn the applicant's interest in the trade, his potential skills, personal traits, and economic and social background.

The present Bureau of Apprenticeship and Training has its origin in the Fitzgerald Act of 1937 which authorizes the Department of Labor to "promote the furtherance of labor standards of apprenticeship" and "bring together employers and labor for the formulation of programs of apprenticeship." From this has grown the national bureau and joint committees, with state, regional, and local BAT directors who set up JACs with contractors and unions who volunteer to participate.

continued on page 137

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"Union oldtimers hold back younger men," says an Atlanta builder, but "contractors throw stumbling blocks in the way of training programs, too."

In the building trades, these committees usually are established on an area-wide basis with contractors, union officials, and vocational educators serving as members. The committee selects apprentices from applicants, arranges for their employment with contractors, and sets up an academic schedule, usually 144 hr per year for each apprentice.

Each committee has the benefit of national apprenticeship standards that have been adopted jointly by national employer associations and international unions in 17 trades.

Until 1959 there were questions in the minds of some contractors as to the legality of funds they might contribute to joint apprenticeship committees. This was clarified by the Landrum-Griffin Act, which permits employer contributions to a trust fund, jointly administered by management and union representatives, to defray apprenticeship and other training costs.

The details of these payments, and provisions for audits and trustee bonding, ordinarily are specified in an "apprenticeship clause" in the bargaining agreement and supplemented by a special agreement with the employer. Contributions by the employer are deductible as business expenses for tax purposes.

Congress also has specified—in the Davis-Bacon, National Housing, and other acts—that apprentices employed on Federal construction projects must be registered with state or regional joint apprenticeship committees.

In the face of the impending shortage of skilled labor to match the upward trends of construction volume and technical advancement, a few far-sighted contractors are stepping up their training efforts, cooperating with joint apprenticeship committees by employing apprentices, and encouraging apprenticeship clauses in bargaining agreements.

But the majority of contractors apparently are content to place the blame for the apprenticeship shortage on unions, instead of initiating the training activity necessary for the years ahead.

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributor Appointments

Barber Greene Co.: Western Machinery Co., Abilene, Tex., has been named distributor for all lines in west central Texas.

Yale & Towne Mfg. Co.: The Roy Klossner Co., San Antonio and South Texas Equipment Co., Houston, will handle the Trojan tractor shovel line in Texas.

FWD Corp.: Sanel Industrial Co., Concord, N.H., has been named truck distributor for the state.

Clark Equipment Co.: The Michigan line will be handled by these new distributors: Western States Machinery Co., Denver, for Colorado; Rowland Machinery Co., Spokane, Wash., for eastern Washington and western Idaho; Western Frontier Machinery Co., Phoenix, for Arizona.

Worthington Corp.: Copper State Tractor, Inc., Phoenix, Ariz., has been named distributor of portable compressors and contractor's tools in all but three counties in the state.

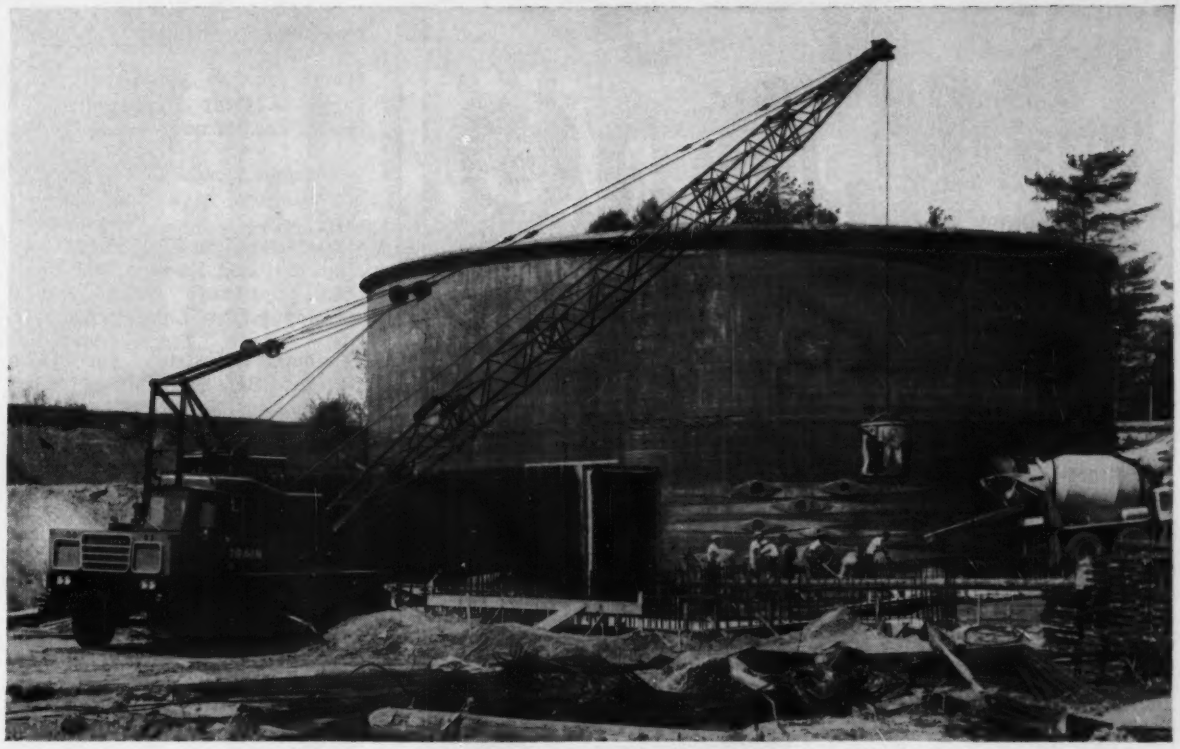
Eimco Corp.: Horne Equipment Co., Inverness, Miss., has been named dealer for the state.

Olin: Olin Aluminum mill products will be distributed by Structural Steel and Forge Co., Salt Lake City, Utah.

Euclid Div.: Drott Tractor Co., Milwaukee, is distributor for Wisconsin excepting Douglas County. G. H. Godsall Equipment, Ltd., Kentville, Nova Scotia, is distributor for the province of New Brunswick, Newfoundland, Prince Edward Island, and Nova Scotia.

Ellicott Machine Corp.: George M. Philpott Co., Inc., San Francisco, has been appointed distributor for Northern California and the Pacific Northwest.

continued on page 140



C. P. Ward's new 25-ton Lorain Moto-Crane MC-325 is shown with an 80 ft. boom pouring concrete for the new Durand-Eastman disposal plant in Rochester.

HERE IS WHY AN 11-TIME LORAIN OWNER BOUGHT A NEW 25-TON LORAIN MOTO-CRANE MC-325

Buying 11 machines of the same make is in itself an endorsement of their performance—but C. P. Ward, Rochester, New York, has learned to expect more from each succeeding Lorain he buys because of Lorain's constant improvements and their additional features. Take his new "MC-325" for instance—here are some of the new items he got that are now busy making him money—

Power-Set® outriggers are now standard on Lorain 25-ton machines. All four outriggers set in about a minute . . . move-ups are even faster.

Shear-Ball® turntable connection provides smoother "ball-bearing" swings—ends adjustment, maintenance, and lubrication problems. 10-year warranty.

Full-circle cab visibility. Picture window design with 360° visibility from operator's position. Walk-thru accessibility.

Removable counterweight, outrigger boxes and beams for highway weight reduction.

Power-operated back-hitch gantry. Controlled from operator's position for maximum capacities or minimum headroom.

New turntable design, all-welded bed and A-frame of heavy steel plate for true shaft alignment.

Square-Tubular-Chord boom, lighter weight, stronger, longer. Pin-connected for ease of assembly.

Lorain-built carrier has twist-free, all-welded, box section frame, 15 speeds forward, and a 47-mph highway speed.

Your nearest Lorain distributor can tell you more about all these features—and can add to this list. Call on him today!

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

DOES MORE FASTER—FOR LESS

PLANTS in Lorain and Elyria, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler from ⅜- to 2½-yard capacity · Cranes from 7 to 80 tons . . . on crawlers, and as rubber tire Moto-Cranes, and Self-Propelled Cranes · Rubber tire front-end Moto-Loaders in 6,000-lb., 7,000-lb., and 9,000-lb. operating capacities.

OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

SALES AND SERVICE . . .
continued

Onan: In the Milwaukee, Wis., area, Clymar Engineering & Sales, Inc., is new distributor.

Champion Heater Co.: These new distributors have been named: McCune and Co., Youngstown, Ohio; Hamilton Equipment, Inc., Ephrata, Pa.; Eastern Machinery Inc., Syracuse, N.Y.; Capital Equipment Co., Lansing, Mich.

Thomas Industries, Inc.: The Wright Saw Div. has named Skarie, Inc., Baltimore, distributor for Maryland.

Motec Industries, Inc.: The Mobilift Materials Handling Equipment Div. has named the Morris Equipment Co., St. Louis, Mo., dealer for 17 Illinois counties and western Missouri.

On the Sales Front

American - Marietta Co.: The Presstite Div. has named Robert W. Drague as manager, rubber products sales.

Dana Corp.: W. H. Schomburg, Jr., is new general sales manager.

Cleaver-Brooks Co.: Walter Schuman has been named sales manager of the new heater division.

Joseph T. Ryerson & Son: William F. Tinlin has been appointed regional manager, Los Angeles and San Francisco, post-tensioning sales, with headquarters in Los Angeles.

Motorola, Inc.: Homer L. Marrs has been appointed vice president, sales, for the Communications Div.

Omark Industries, Inc.: Paul J. O'Herron has been named field sales manager.

Erie Strayer Co.: Kenneth Simpson has been named to the new post of western regional field engineer, serving Washington, Oregon, and California from San Francisco.

Willys Motors, Inc.: Richard B. Teiper has been named manager of sales administration.

Baldwin-Lima-Hamilton Corp.: Henry F. Barnhart is new vice-president in charge of sales for construction equipment.

continued on page 147

ANNOUNCING GMC TRUCKS FOR '62...WITH BUILT-IN BONUSES!

GMC
GENERAL MOTORS CORPORATION
TRUCKS
FROM ½ TO 60 TONS

PULL HERE

TEAR OUT AND SAVE

NEW IN MANY LIGHT AND MEDIUM-DUTY MODELS—

NEW HIGHEST PERFORMANCE! NEW OUTSTANDING ECONOMY! NEW DEPENDABILITY!

Now, GMC brings you—as standard equipment—the great performance of the exclusive, fuel-saving 165 hp. V-6 engine! You get the *most working power* at low rpm of any comparable truck. Get your hauling job done quicker, easier and save fuel at the same time. And this proved 305D is a *truck-built* engine with usable power, top performance, produced at low, wear-resistant speeds to give you extra-bonus life . . . at no extra cost.

Notice the new, distinctive GMC styling including lower hood with rounded edges for safer vision. New sparkling colors, inside and out. Triple-stitched upholstery increases seat life. Suspended pedals are easy to reach and operate. Instruments are redesigned for better reading, safer driving.

For 1962, you get new or improved profit-making advances in new GMC 105″ Conventionals, from ½-ton pickups to the big 60,000 lbs. GCW six-wheelers.

NEW 105″ CONVENTIONALS

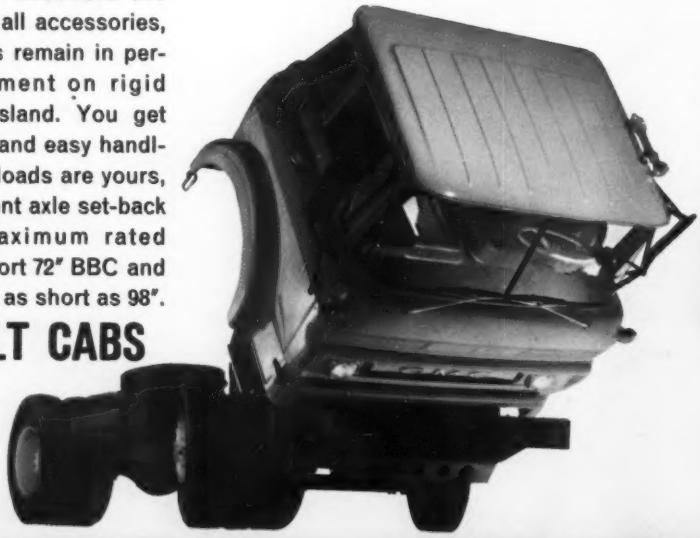
Wideside 4-wheel-drive Custom Pickup—5,600 lbs. GVW

PROVED AND IMPROVED MEDIUM AND HEAVY-DUTY MODELS—

EASY SERVICING . . . EASY DRIVING . . . IDEAL WEIGHT DISTRIBUTION!

. . . all yours with GMC Steel Tilt-cabs. Full 55 degree tilt completely uncovers the engine and all accessories, but controls remain in perfect alignment on rigid stationary island. You get short turns and easy handling. Bonus loads are yours, too, with front axle set-back 52″ for maximum rated capacity, short 72″ BBC and wheelbases as short as 98″.

72″ TILT CABS



SUPERIOR

GMC Model 3505
18,000 lbs. GVW

Here are just a few applications of GMC Construction Trucks for 1962.

R PERFORMANCE!

This 90" BW7012 has the most powerful standard gas engine in any construction truck . . . the exclusive 275 hp. Twin-Six. Another example of how GMCs save time and expense. You can also get the only bonus-life, fuel-saving V-6 gas engines in the industry. Also V-6 diesels with high earning power and great saving power. Available in models from 19,500 lbs. GVW to 120,000 lbs. GCW.

90" CONVENTIONALS

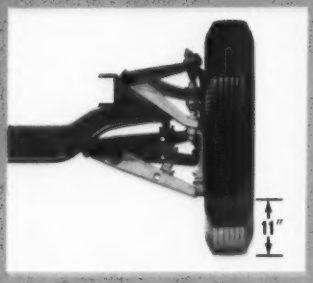
LOW-COST SIX-WHEELERS WITH BUILT-IN STAMINA THROUGHOUT!

This new GMC W5008 six-wheeler saves you money when you buy and as you own. Here's why: (1) Buying price is surprisingly low, (2) You get the exclusive, bonus-life V-6 engine, 351 cu. in. or optional 401 cu. in. (3) Suspensions are improved for easy riding and continuous high axle loadings, (4) Low ground to cab floor height for easy in and out, (5) Plus many more built-in durability and dollar-saving bonuses.

105" CONVENTIONALS

BUILT-IN BONUSES MAKE 1962 G

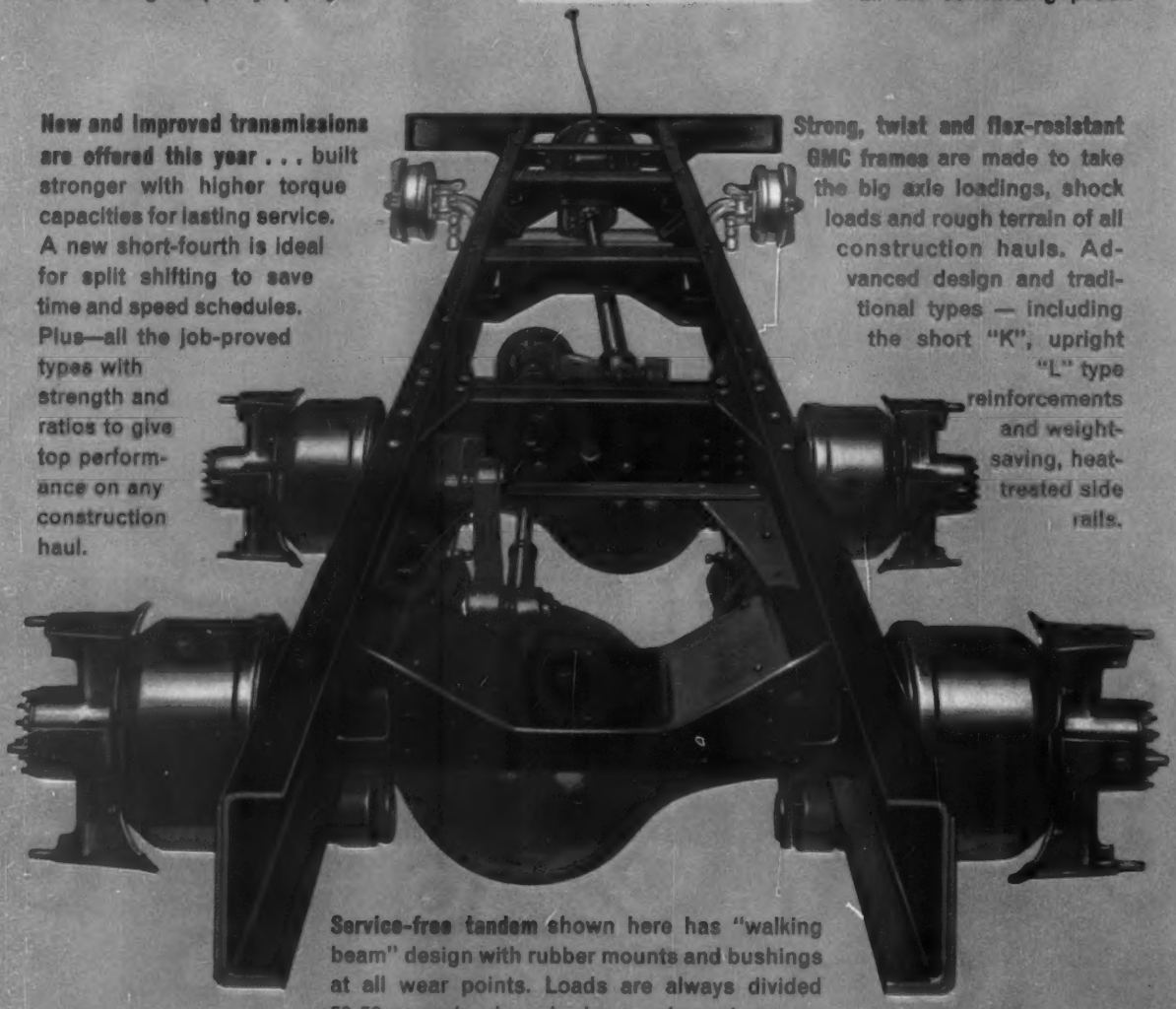
Improved suspension. New, low deflection rate springs and shock absorbers are standard on wide-tread, I-beam front axles. You get good cushioning, great stability and short turning. Also available: higher-capacity front axles with these easy-ride springs, or with high-capacity springs.



Smooth out bumps up to 11" high with GMC's independent front suspension. Wheel fight is eliminated. Handling is easier and safer. Riding is smoother, nearly like a passenger car. One ride will give you all the convincing proof.

New and improved transmissions are offered this year . . . built stronger with higher torque capacities for lasting service. A new short-fourth is ideal for split shifting to save time and speed schedules. Plus—all the job-proved types with strength and ratios to give top performance on any construction haul.

Strong, twist and flex-resistant GMC frames are made to take the big axle loadings, shock loads and rough terrain of all construction hauls. Advanced design and traditional types — including the short "K", upright "L" type reinforcements and weight-saving, heat-treated side rails.



Service-free tandem shown here has "walking beam" design with rubber mounts and bushings at all wear points. Loads are always divided 50-50 on each axle and axles are always in proper alignment for increased tire and axle life.

Long-life, easy-ride vari-rate rear springs are standard on four-wheel models. Springs only support the load. Braking and torque reactions are transmitted to the frame by the built-in torque leaf. Springs are free at both ends, ride on cams that automatically adjust the springs to the loads.

SEE YOUR GMC TRUCK DEALER LISTED IN THE YELLOW PAGES FOR ALL THE PROFIT-FACTS.

GMC TRUCK & COACH — A GENERAL MOTORS DIVISION — PONTIAC, MICH.

V-6
ENGIN
OUTLA
ALL O

These are t
with no co
passed dur
rugged, rigi
the entire bu
too. GMC V
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speeds. Pow
wear are r
costs are at

ENGINE MODEL	T R
305D	27 1
305C	27 1
351	3 1
401	3 1

*Optional

GMC CONSTRUCTION TRU

6 EXCLUSIVE, 6 COST-BUSTING GINES . . . BUILT TO LAST, OUTPERFORM OTHERS!

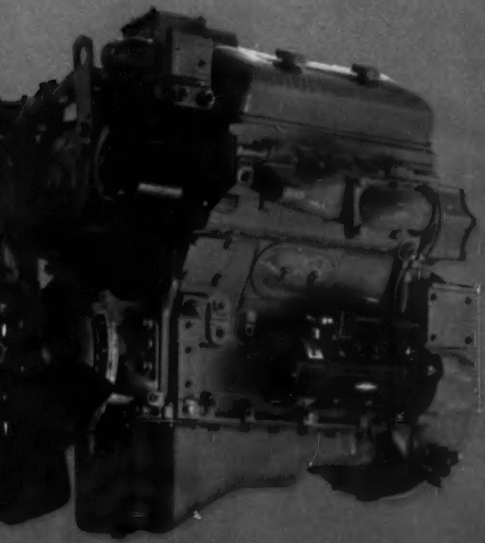
are truck-built engines for trucks only, o compromises, to give you unsur- durability. Every part is built extra- rigidly inspected and tested during re build-up. You get top performance, MC V-6 usable working power is pro- over a broad range at low operating Power-robbing friction and damaging re reduced. Fuel and maintenance re at a minimum.

E	MAX. TORQUE RANGE	MAX. HORSE-POWER	TRUCK SERIES
	275-280 @ 1100-2400	165 @ 3800	1000, 1500, 2500 3000, 3500
	275-280 @ 1100-2400	165 @ 3800	4000, B & L4000
	308-312 @ 1400-2400	180 @ 3400	5000, W5000 B & L5000 BW5000 4000* B & L4000*
	375-377 @ 1200-2000	210 @ 3400	H5000, W5500, B & L5500 BW & LW5500 W & BW5000*

● Piston travel is up to 26% less than comparable engines. Saves thousands of engine rpms every mile to reduce gas bills and service costs. GMC-built aluminum pistons have cast-in steel expansion band, chrome-faced top ring, big 1.24" diameter piston pin that's case-hardened and everything for lasting operation and proper oil control.

● Every GMC connecting rod is checked and inspected 9 ways to guarantee exacting dimensions and weight . . . to assure you extra bonus life.

● V-6 crankshafts are twice as husky as comparable V-8s . . . tougher, stronger to last longer. Bearing areas are up to 60% greater than comparable engines for thousands of extra trouble-free miles.



MORE POWER PER DOLLAR PER POUND PER CUBIC INCH

GMC Truck diesel engines are lower cost, up to 530 pounds lighter and several inches shorter than comparable diesels. You get faster acceleration, smoother power and increased fuel economy with GMC's two-cycle design that produces power on every downstroke, double that of four-cycle engines. And there are many, many more built-in bonuses your GMC Diesel Truck Dealer will gladly explain.

Max. Torque—604 @ 1200 Max. Hp.—218 @ 2100

At sea level and 60°F

UCKS A SOUND INVESTMENT!

TEAR OUT AND SAVE

COOLER RUNNING... NEEDS LESS CARE

Valves are made to last with short, stiff stems—sodium-filled on 351 and 401 exhaust valves—for better heat dissipation and added life. Big diameter valves permit freer breathing for top efficiency. Integral valve guides reduce stem exposure to hot gases and assure faster heat transfer.

Most effective method of prolonging valve life is GMC rotators. Positive, self-cleaning action prevents premature failures. Optional on 305D, standard on all others.

Concentrated, damaging "hot spots" are eliminated with up to 167 gallons of coolant circulating every minute and with up to 33% more cooling surface than other engines. Coolant temperature varies less than 4 degrees throughout the entire engine. More proof that GMC engines are built to last longer.

Exhaust valve seat inserts, standard in 351 and 401 engines, are made of hard nickel-chromium-tungsten-cobalt alloy steel to withstand the intense heat and wear.

ENGINE MODEL	MAX. TORQUE RANGE	MAX. HORSE-POWER	TRUCK SERIES
702	625-630 @ 1400-2100	275 @ 2400	8 & L7000 BW & LW7000

MOST LOAD-MOVING POWER YOU CAN GET! EXCLUSIVE, BONUS-LIFE TWIN-SIX

This is the only standard gas engine that gives you 275 hp. performance . . . the power needed to get the big loads rolling without laboring the engine or driveline . . . the power to keep rolling with up to 60% less shifting than trucks with other gas engines. And this is low-stress, easy-stroking power, as you can see on the chart. Results: amazing fuel economy and greatly increased engine life.

SALES AND SERVICE . . . *continued*

Dundee Cement Co.: Robert G. Fleming has been named sales representative in the Chicago district.

Black & Decker: Arthur S. Boehm is sales manager of the Industrial-Automotive Div. Joseph H. Schmidt, Jr., has been named Consumer Products Div. sales manager.

Owatonna Tool Co.: The tools and equipment division has named Martin M. Shea district manager for Virginia, Maryland, and the District of Columbia. William T. McCorkle is Florida district manager.

New York Air Brake Co.: The Hydreco Div. has appointed E. Robert Carpenter new general sales manager.

Mas Con Supply Co.: Frank W. Tharp will handle Jahn forming brackets in Colorado and Wyoming.

Dresser Industries, Inc.: Clark Bros. Co. has named Charles P. Clark, Jr., manager in the new Buffalo, N.Y. sales office.

Special Mention

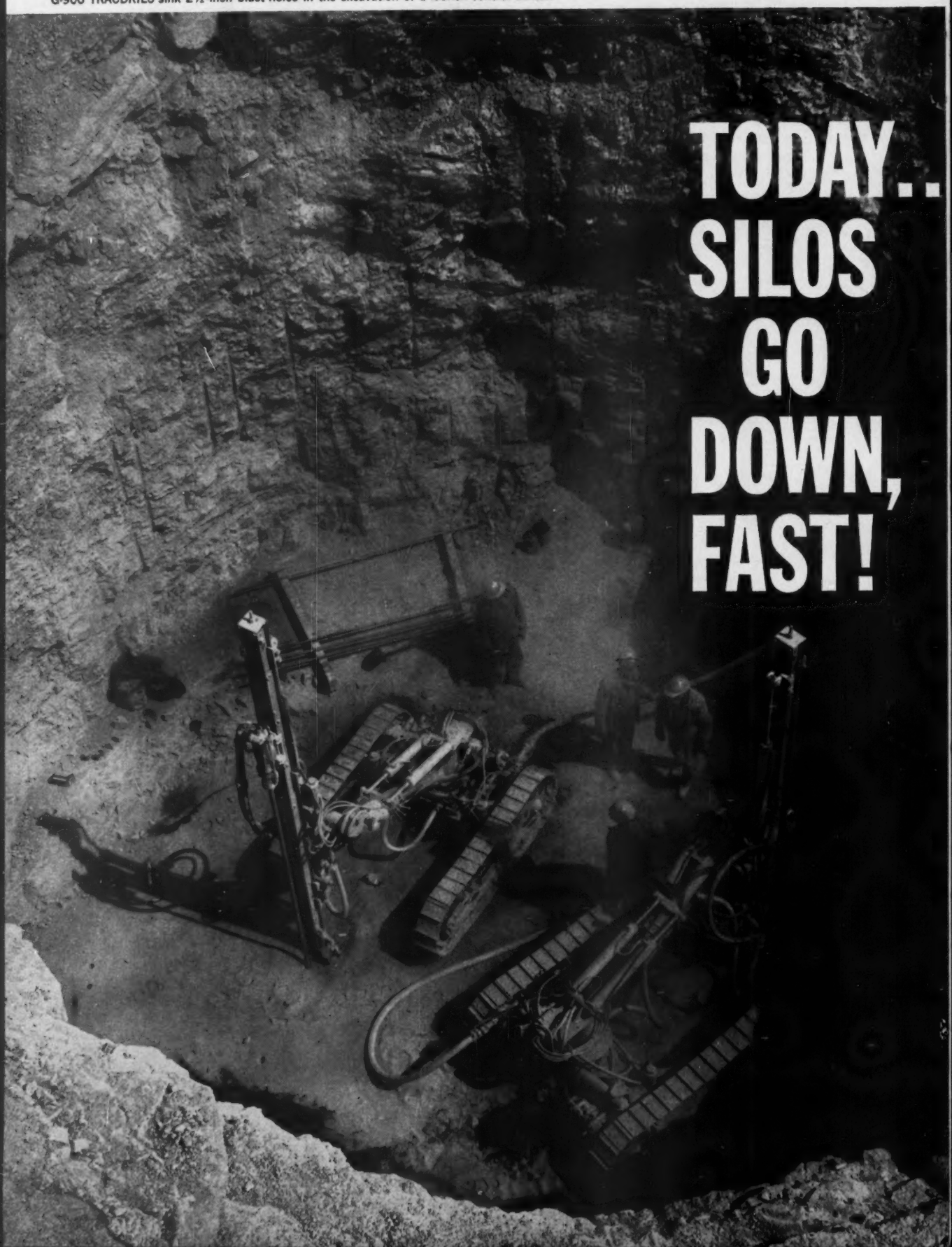
Mersick Industries, Inc.: The company has purchased the Windsor-Pippin Corp. in an exchange of stock. The earthmoving and loading equipment manufacturer will operate as a subsidiary.

International Harvester Co.: Diesel engines in five power sizes, built by a subsidiary in Neuss, West Germany, are being imported by the Construction Equipment Div. The engines have two, three, and four cylinders and range from 66.3 to 132.7 cu in. in displacement.

Allis-Chalmers Mfg. Co.: A new plant for the production of gasoline, diesel, butane, and natural gas engines has been completed at Harvey, Ill.

Bethlehem Steel Co.: The $25 million Homer Research Laboratories has been dedicated at Bethlehem, Pa. Technological research activities will range from ceramics to nuclear studies.

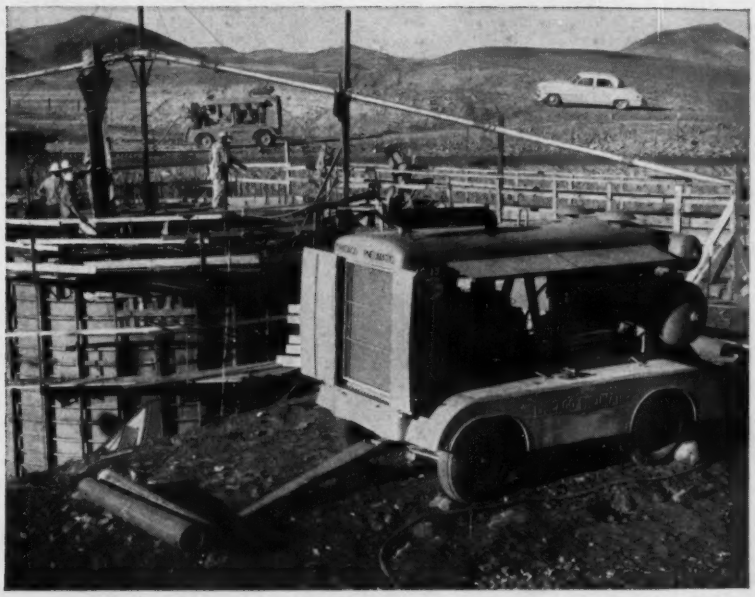
G-900 TRACDRILS sink 2½-inch blast holes in the excavation of a launch control center.



T-650W REICHdrill sinks a burn hole for a missile silo. Capacity: hole size to 7⅞-inches: Down pressure: 34,000 lbs.

Today, more silos go down than up . . . and they go down, fast! On many of these jobs extreme conditions are commonplace. Many top missile base contractors find that the combination of CP Drilling and Construction Equipment, backed by highly efficient "Power Vane" Rotary Compressors, will beat any job condition . . . help them cut costs . . . maintain schedules. ■ CP TRACDRILS for more blast holes from every drilling position. Drill to left or right with boom at right angles to tracks, swing a full 180 degrees. Duplicate controls at turret and boom end save time and steps for drillers. ■ CP REICHdrills move quickly, reduce traveling time when drill sites are widely scattered. Hole sizes to 12 inches. ■ CP AIR COMPRESSORS for powering concrete placement and vibrating equipment, pumps, sinker drills, bolting equipment have established a reputation for staying power. "Power Vane" Rotary two-stage design permits continuous operation at pressures to 125 psig . . . lowers power consumption, reduces fuel costs. Fuel-thrifty, normally-aspirated engines maintain torque and power at all operating speeds . . . maintain efficiency at high altitudes. ■ FOR FULL INFORMATION on CP construction equipment, write to: Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.

CP-69 SINKER drilling blast holes to clean up silo bottom. These tools handle easy, hit hard.



("POWER VANE" 365 ROTARY COMPRESSOR supplies air to CP Concrete Vibrators in a concrete pour. CP-600 Compressor in the background supplies air for concrete placer.)

CP CONCRETE VIBRATORS knock down concrete fast . . . keep stiff batches moving . . . place flaw-free concrete in record time.

Chicago Pneumatic

AIR COMPRESSORS • PNEUMATIC AND ELECTRIC TOOLS • AIR-BLAST BITS • DIAMOND DRILLS • REICHdrills • ROCK DRILLS

Circle 149 on Reader Service Card

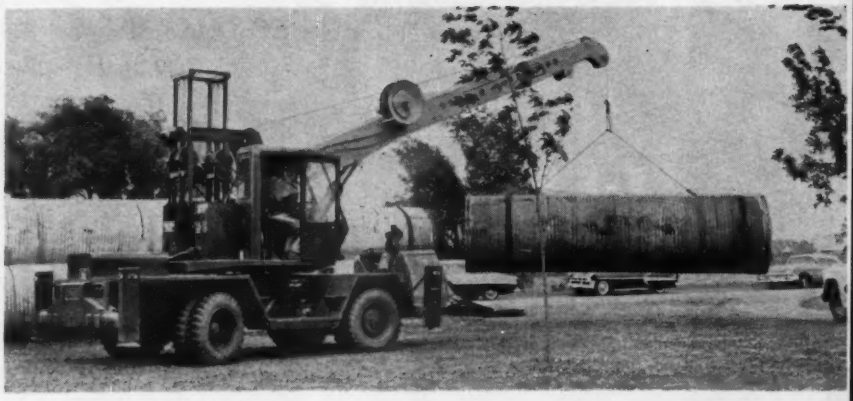
Construction Equipment News

For more information on any item, circle the key number, found at the end of each item, on the READER SERVICE CARD just inside the back cover.

Mobile Crane Excavator Works in Close Quarters

A new carrier featuring mobility for close-quarter yard work has been designed for Bucyrus-Erie's 12-ton Hydrocrane crane excavator. The H-5 wagon has a turning radius of 22 ft, a 110-in. wheelbase, and is 35 ft long with its two-piece boom retracted. All controls are in the crane's cab. Outrigger housings are built into the wagon's body—Bucyrus-Erie Co., South Milwaukee, Wis.

Circle **301** *on Reader Service Card*



Sturdy Dump Truck For Off-Highway Work

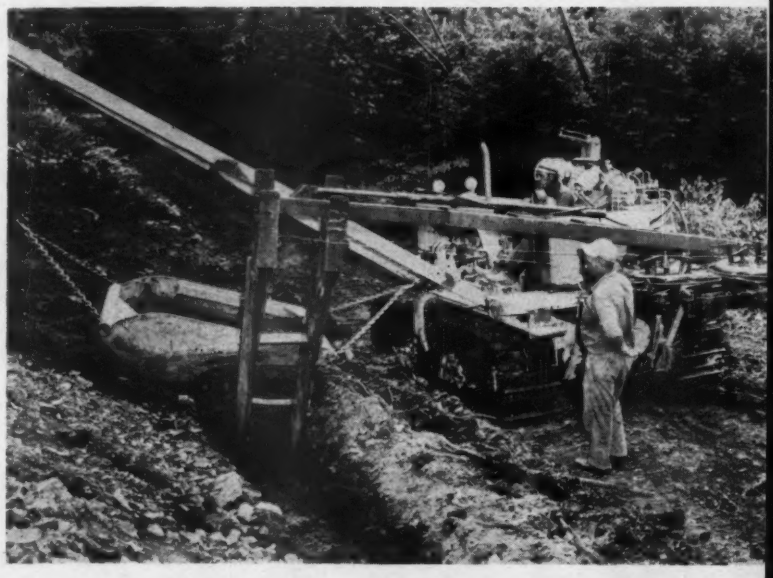
A four-wheel-drive dump truck built for off-highway use is among Dodge's 1962 trucks. The W-500 has a 157-in. wheelbase, 125-hp, six-cylinder engine with 251-cu-in. displacement, and four-speed transmission. The 4-cu-yd truck has a maximum gross vehicle weight of 20,000 lb. A 202-hp, V-8 engine and five-speed transmission are available.—Dodge Corp., Detroit, Mich.

Circle **302** *on Reader Service Card*

Rig Strings Cables, Then Backfills in One Pass

A hydraulic guard wire attachment has been added to the 150-B bucket backfiller, enabling the unit to string cable and backfill in one operation. The attachment is hydraulically controlled by two valves: one valve raises boom, another extends and retracts it. The unit is mounted on a TD-15 crawler with 12 speeds. International Harvester Co., Chicago, Ill.

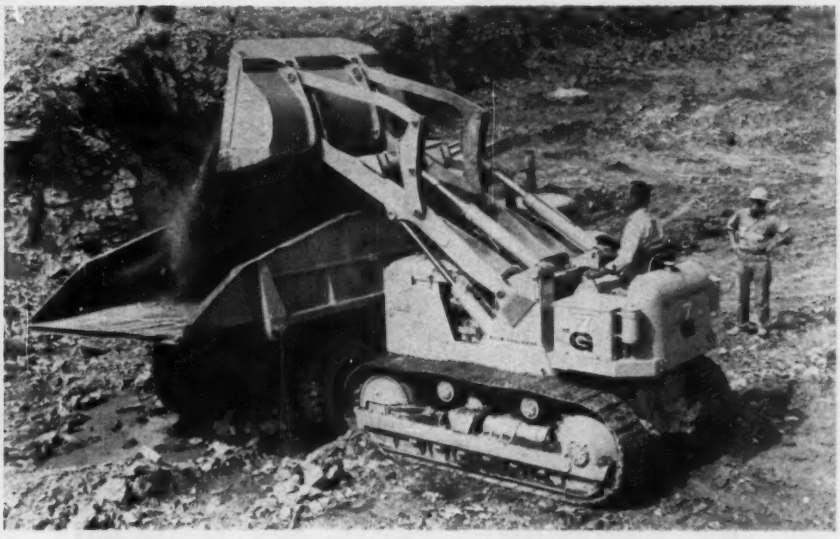
Circle **303** *on Reader Service Card*



Compressor-Tractor Handles Wide Assortment of Jobs

Pneumatic tools can be operated at the same time an accessory is being used on the Pneumatractor, a 125-cfm air compressor and tractor in one unit. This is made possible by a controlled delivery feature which allows selection of 42, 84, or 125-cfm air. New accessories for the self-propelled unit include Model 12F backhoe, in 12 to 36-in. bucket sizes, and Model 4M loader, available in ½ or 1-yd bucket sizes. Other accessories include rock drills, post drivers, tampers and angle dozer blades.—Schramm, Inc., 900 East Virginia Ave., West Chester, Pa.

Circle 304 on Reader Service Card



Power Steering, Brakes Featured on New Loader

Hydraulic power steering and oil-cooled power brakes are features on Allis-Chalmers' new 1¾-yd tractor shovel. The HD-7G has a speed-control governor that can be set to any working travel speed, eliminating surges and slowdowns. Speeds range to 5.9 mph forward and 4.2 mph in reverse. A 100-hp turbocharged diesel engine powers the unit. — Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Circle 305 on Reader Service Card

Dump Body Is Bigger For New Cat Tractor

A new rear-dump body with a 27-ton capacity has been designed for the Caterpillar 280-hp 619C diesel tractor. The latest addition to Athey's articulated unit line features open-mouthed body design for easier loading.—Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill.

Circle 306 on Reader Service Card

EQUIPMENT NEWS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Tuckpointing Rig Works On Low Air Pressure

A tuckpointing machine that uses low air pressure from a small compressor permits mortar to be extruded at a variable speed. A rubber cone works as a diaphragm to supply mortar at a uniform rate. The operator fills the container with mortar that is then pressed through a hose and nozzle into joints between brick or stone. The unit also can be used for caulking. — Press-Tuck Applicators, PO Box 11, Western Springs, Ill.

Circle 307 *on Reader Service Card*

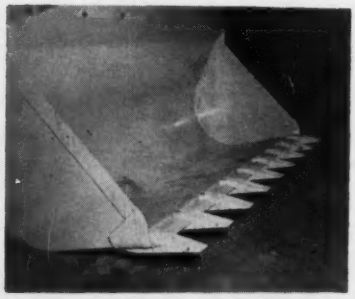
Power-Shift Transmission Is Optional on Scraper

Power-shift transmission is now optional equipment on the B Tournapull. Gear underlap and overlap have been eliminated by double-acting clutches that cannot engage simultaneously. Lubrication of the transmission is force-fed through the shafts for the bushings. Bearings and gears are fog or mist-lubricated, reducing the amount of oil within the case. The B Tournapull has 25-yd struck and 32-yd heaped capacity, and is powered by a 430-hp diesel engine. Maximum speed with standard stepgear transmission is 28.3 mph, and with power-shift transmission, 30 mph.—LeTourneau-Westinghouse Co., 2301 NE Adams St., Peoria, Ill.

Circle 308 *on Reader Service Card*

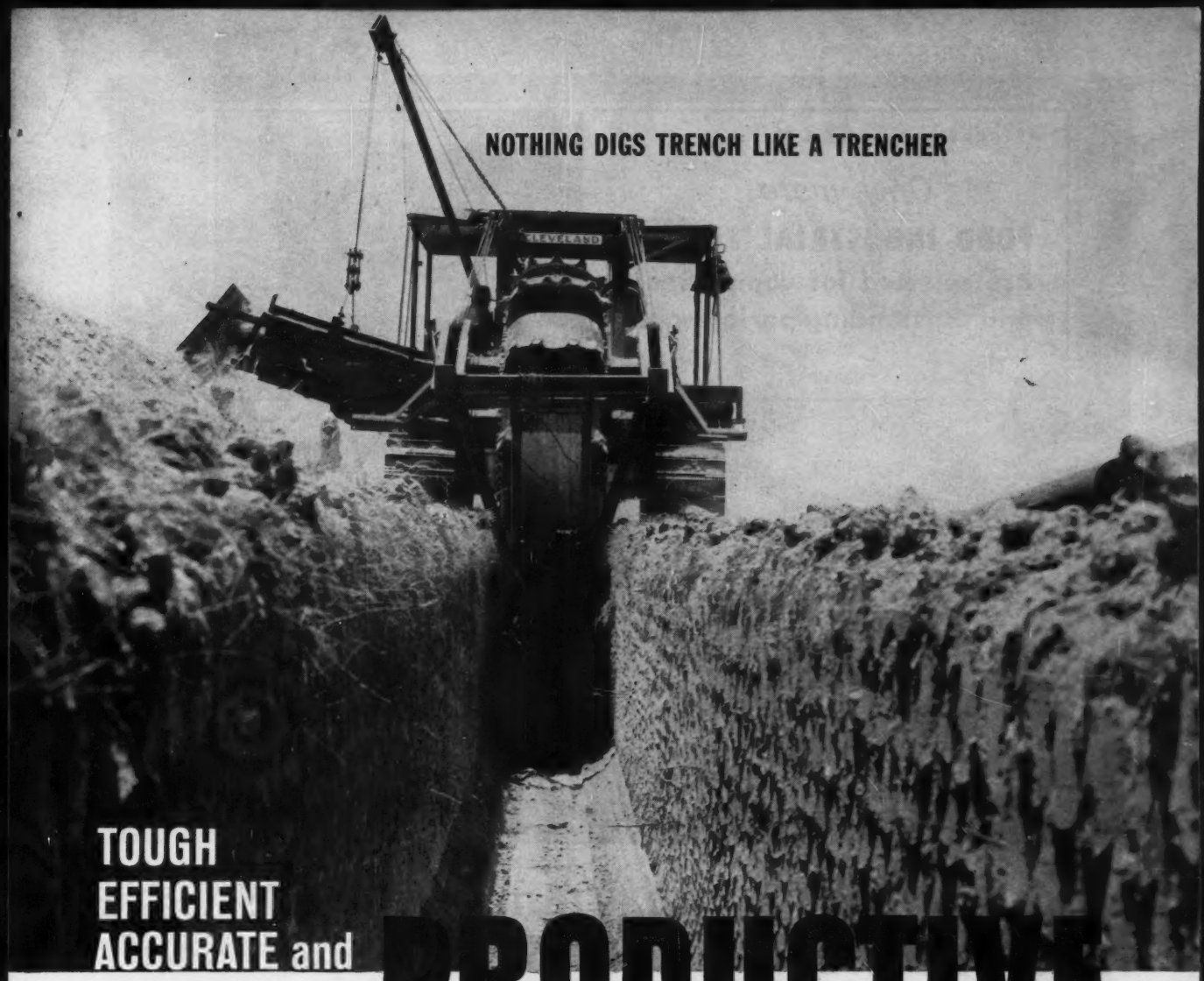
Bucket Teeth Last Longer

Longer tips now are available for Cat loaders that are expected to last twice as long as present tips. They are in two designs: "runner," for wheel loaders where



wear is usually on the underside; and "digger," for track loaders where wear is on the upper surface. The tips are from 1⅞ to 2-in. longer, and fit the bucket tooth adapters now available. — Caterpillar Tractor Co., Peoria, Ill.

Circle 309 *on Reader Service Card*



TOUGH EFFICIENT ACCURATE and PRODUCTIVE

For fast, accurate, low-cost trench production no other type of excavating machine can compare with the modern, full-crawler-mounted, wheel-type trencher—the trencher originated and perfected by Cleveland.

Other-type excavators use stop-and-go, interrupted-cycle digging action suitable for other types of excavating work. The trencher's digging action is *continuous* and all operations are performed *simultaneously* . . . it travels . . . it digs and grades . . . it fines, elevates, conveys and deposits spoil ready for fast, economical backfilling.

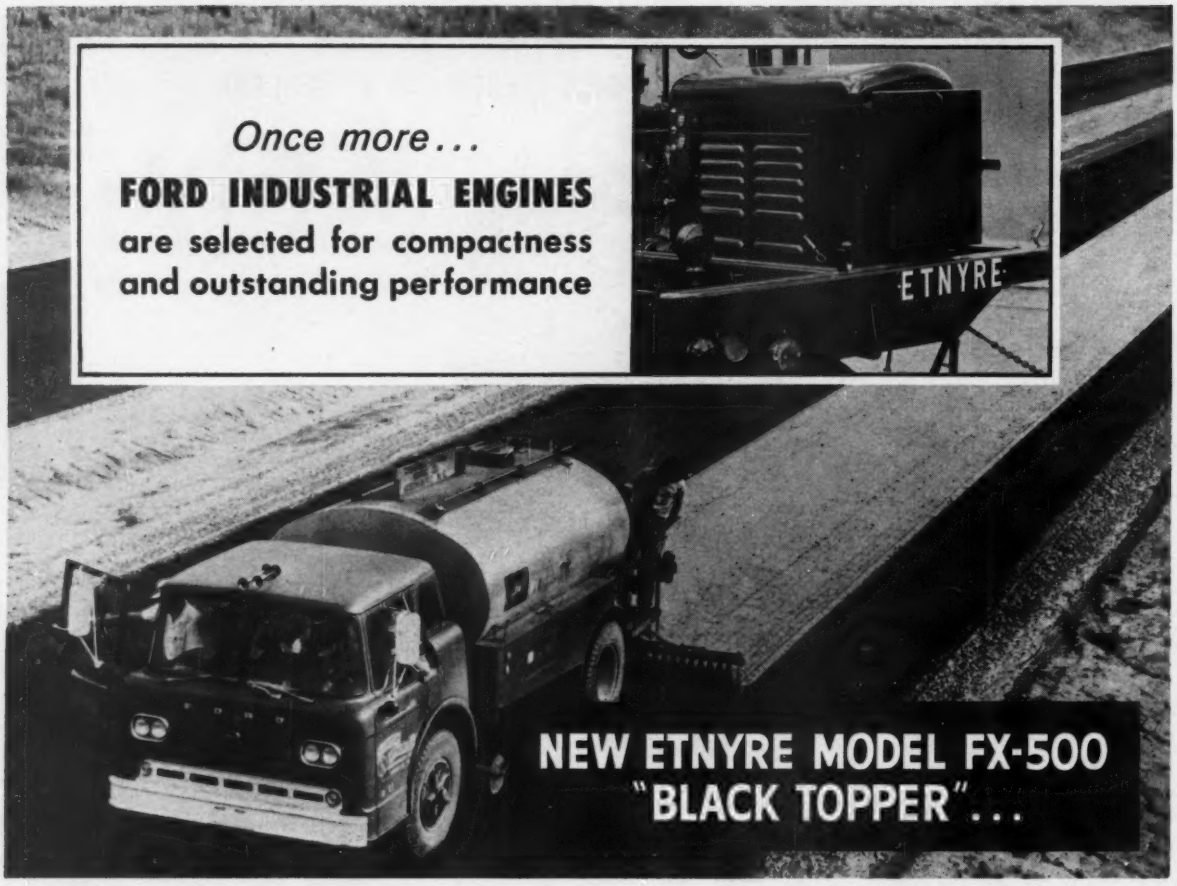
The trencher employs the strongest, most productive digging element—the wheel. The most stable and maneuverable type of mounting—the full crawler—permits maximum exploitation of the wheel in continuous digging. Simultaneous crawler progress and wheel rotation produce positive forward crowd into the digging, and maximum utilization of power at the point of digging. Especially designed for lineal excavation, the trencher digs trench far more productively and economically than other types of excavators.

Investigate now the profit potential of a modern trencher —a dependable, accurate, productive Cleveland Trencher.

CLEVELAND TRENCHER

THE CLEVELAND TRENCHER CO., 20100 ST. CLAIR AVE., CLEVELAND 17, OHIO

Circle 153 on Reader Service Card



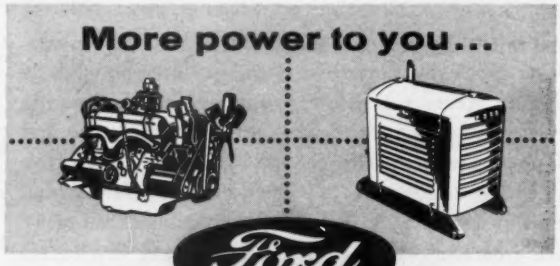
designed for maximum payloads... and dependable, economical operation!

It's easy to see why Etnyre chose a Ford Industrial Engine for their FX-500 "Black Topper" . . . Ford engines deliver the kind of peak performance that construction work requires. Dependability and economy of operation are just *two* of the many advantages enjoyed by OEM's using Ford Industrial Engines. They're *compact* engines, allowing greater freedom of equipment design, and delivering *more horsepower per pound of engine weight than ever before possible!*

Parts and service availability is *immediate*, with a nationwide network of Ford Dealers carrying a complete stock of more commonly purchased engine parts.

Only Ford offers a full line of modern, overhead-valve design engines to meet every power requirement.

Ford engines range from 134 to 534 cubic inches, including modern diesels. Most of these engines are available as foot- or skid-mounted power units. Whatever your industrial power need, it'll pay you to specify Ford Industrial Engines.



Ford
INDUSTRIAL ENGINES
AND POWER UNITS

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

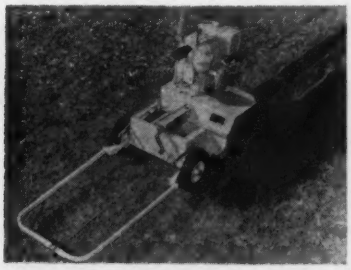
INDUSTRIAL ENGINE DEPARTMENT, FORD DIVISION, FORD MOTOR CO., P.O. BOX 598, DEARBORN, MICH.

West of Rockies write to:
FORD INDUSTRIAL ENGINE DEPT., P.O. BOX 6787, LOS ANGELES 22, CALIF.
FORD INDUSTRIAL ENGINE DEPT., P.O. BOX 1666, RICHMOND, CALIF.

Circle 154 on Reader Service Card

EQUIPMENT NEWS . . .

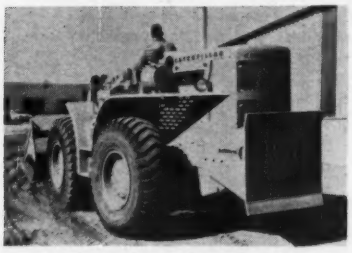
For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.



Utility Trencher Pulls Itself on Winch Line

Trenches from 6 to 3-in. wide and up to 36-in. deep can be dug at speeds up to 500 ft per hr with a new trencher that propells itself by a six-speed winch drive. The W-36 has a torque limiter that disengages when a shock load is encountered, self-locking depth control, and it can move under its own power to a new trenching site at 4.5 mph. The unit comes equipped with a main stake, dead-man stake, and guy line. — Davis Mfg. Co., 1500 S. McLean Blvd., Wichita 13, Kans.

Circle 310 on Reader Service Card



Push Plate for Wheel Loaders Doubles as Counterweight

A push plate attachment for Cat wheel loaders also serves as a counterweight when loading. The plate will provide better traction when dozing or plowing with Cat 966, 944 and 922 units.—Balderson, Inc., Wamego, Kans.

Circle 311 on Reader Service Card

Safety Nets Are Nylon

Nylon safety nets, originally designed to protect workmen at missile sites, are available in 22-ft-sq sections that can be joined together. The webbing has a tensile strength of 3,000 lb.—Rose Mfg. Co., 2700 West Barberry Place, Denver 4, Colo.

Circle 312 on Reader Service Card

Whichever they have to load, truck or gondola, McDonough's 4½ yd Michigans do the job fast. Typical 12 yd semi takes 1 to 1½ minutes, 70 ton railroad car five minutes or less.

Sister quarries share
Michigan Tractor Shovel fleet, report

6 machines do the work of 12

At McDonough Brothers' two quarries near San Antonio, Texas, six Michigan Tractor Shovels are doing the material handling normally assigned a fleet of loaders *and dozers* at least twice as big.

Power, speed, and capacity of their five 262 hp 4½ yd Model 275A Michigans take care of all the heavy work (except shot rock loading) at both quarries, both crushers, and at an adjacent 7500 lb continuous-mix bituminous plant . . . while a smaller 1¼ yd Model 75A stockpile-loads the 4 and 6 yd trucks and handles scattered odd jobs.

All told, the Michigans regularly handle eight major jobs:

- Load all trucks hauling stockpiled materials produced by both crushing plants . . . twenty-four or more separate stockpiles.
- Dress all stockpiles.
- Load one-third of all 70 ton railroad gondola cars at both plants.
- Replace donkey engines for moving and spotting gondolas.
- Load all trucks hauling aggregates and sand to charge the bituminous plant.
- Truck-load finished bituminous materials.

- Clean quarry floors after blastings and push shots up to the heavy rock shovels for loading.
- Maintain all haul roads in all plant areas.

Michigans load in record time, get job assignments by 2-way radio

Loading time on all these assignments has proved exceptionally fast. A typical 12 yd semi is loaded in only 3 passes of a Model 275A's 4½ yd bucket *and an average of 72 seconds.* A typical 70 ton gondola car is loaded in 5 minutes or less.

Two-way radios help save time too. As a haul unit enters either McDonough yard, the central control station located at the scale house radios the Michigan working nearest the required stockpile. Over the Michigan drives, fast as the truck. Time is also saved by radio-directing the speedy Michigans to other assignments over the one-half mile radius between the two quarries. With this system, maximum production is maintained . . . idle machine time virtually eliminated.

Two new 25-ton Michigan Model 210 Tractor Wagons have also been recently added to McDonough Brothers' Michigan equipment spread. Replacing several large tandem-dump trucks, the rear dump Michigans haul aggregates from hopper to assorted stockpiles up to 3,000 feet distant . . . and feed the bituminous plant when it is operating. Occasionally, too, the hefty 31.4 mph units fill in as shot rock haulers when one of the rock hauling trucks is down for repairs.

Dependability a prime reason why McDonough Brothers prefer Michigans

McDonough Brothers purchased their first Michigan five years ago—a Model 175A with 2¾ yd bucket. Three years, and over 10,000 meter hours later, it was traded for a larger Model 275A. Then expanding operations, combined with Michigan's excellent performance, caused the addition of four more Model 275A Michigans and one Model 75A to bring the fleet up to present strength.

Typical of the performance turned in by the Michigans today is an hourmeter reading taken at random from one Model 275A. In 17 months of operation, it showed 4,915 hours —an average of 66.4 hours worked each week since purchase.

Co-owners Jim, Dan and John McDonough are completely satisfied with their Michigan units. "Michigan Tractor Shovels have proven highly successful in our quarry operations," reports Jim McDonough, "And we like the dealer service organization (Waukesha Sales & Service, Inc., San Antonio, Texas) behind them."

In addition to loading and stockpiling, Michigans perform other quarry jobs such as floor cleanup, haul road maintenance and switching of 70 ton gondola cars.

Demonstrate? Glad to!

Your Michigan Distributor will be glad to demonstrate a Michigan Tractor Shovel *on your job* at no obligation. Call him and select the size that best fits your operations . . . nine models . . . with lift capacities from 3,000 to 29,000 lbs.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2403 Pipestone Road
Benton Harbor 2, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Circle 157 on Reader Service Card

EQUIPMENT NEWS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Spray Heads on Tanker Controlled From Tractor

Front and rear spray heads on a 7,300-gal capacity water tanker are individually controlled from the tractor cab for uniform coverage or spot wetting. Water output for the tank, adapted for use behind all rubber-tired prime movers, is rated at 1,500 gpm with a gasoline or diesel auxiliary

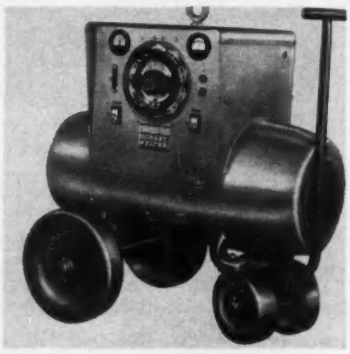
pump engine. — Klein Welding Service, Inc., 14618 E. Arrow Highway, Baldwin Park, Calif.

Circle 313 *on Reader Service Card*

Larger Loader and Trencher New in Ware Attachment Line

A 60-in. bucket with 34-deg breakout is featured on Ware's 561 loader for the Oliver 550 tractor. The loader has a 7,200-lb breakout capacity, automatic bucket leveling with a close carrying position, and rated lift of 3,800 lb. Also new is Model 400 Hydro-Trencher with a quick-detach system, a digging reach of 18 ft, 4½ in. from center line of rear axle, and depth of 12 ft, 3½ in. The trencher has a 10,500-lb breakout capacity, 180-deg swing, and 5,400-lb lift capacity at a 5-ft radius. — Ware Machine Works, Inc., Ware, Mass.

Circle 314 *on Reader Service Card*



Welders Have Control Panel With Protective Visor

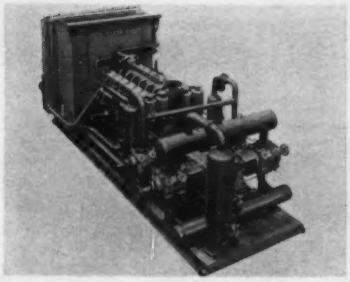
A new line of dc motor generator arc welders has a control panel that is protected by a visor. All models have a multi-range dual control, with 10 main ranges of welding current and 100 steps of volt-ampere adjustment in each range. Rated at 60% duty cycle, 200, 300, and 400-amp models are available for either 50 or 60-cycle operation.—Hobart Bros. Co., Troy, Ohio.

Circle 315 *on Reader Service Card*

Submersible Pumps Have High Output

A new line of portable submersible pumps features a 20-lb unit that can handle 120 gpm. Model 900 is 11¾ in. long and 5⅜ in. in dia. The ¾-hp unit operates from a single phase 115-v power line or auxiliary 1,000-w generator, and comes with a watertight switch and cable. Accessories include a carrying handle, hose adapters, and a mushroom strainer. — Prosser Industries, Inc., 900 East Ball Rd., Anaheim, Calif.

Circle 316 *on Reader Service Card*



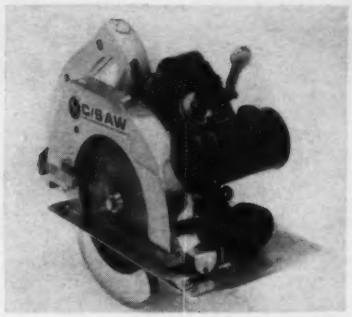
Packaged Field Compressor Produces 750-Belt-Horsepower

Latest addition to Clark Bros.' packaged field compressor line is the 750-bhp Model CFB-4, designed for heavy duty applications where one to four stages of compression and high capacity are required. The unit has a 5-in. stroke and four cylinders. Cylinder sizes from 21 to 2¼-in.-dia cover a pressure range from vacuum to 6,000 psi.—Clark Bros. Co., Div. of Dresser Industries, Inc.. Olean, N.Y.

Circle 317 *on Reader Service Card*

Powered by Gas Engine

A ¾-hp gasoline engine powers the C/Saw, a portable circular saw with an 8-in. blade. The



ohllson and Rice 2-cycle engine has roller bearings, recoil starter, and develops 3,500 rpm. Location of the gas tank and a continuous-flow, diaphragm pump give the saw full power in any position. The saw operates for an hour on a tank of gas. Bevel adjustment is calibrated from 90 to 45 deg. The unit weighs 11 lb.—Comet Mfg. Div., Siegler Corp., 875 Arroyo Parkway, Pasadena, Calif.

Circle 318 *on Reader Service Card*

Tractor Shovel Features 13,000-Pound Lift Capacity

The latest in Nelson's line of four-wheel-drive tractor shovels is a 13,000-lb capacity lift unit. Model 250D has power shift

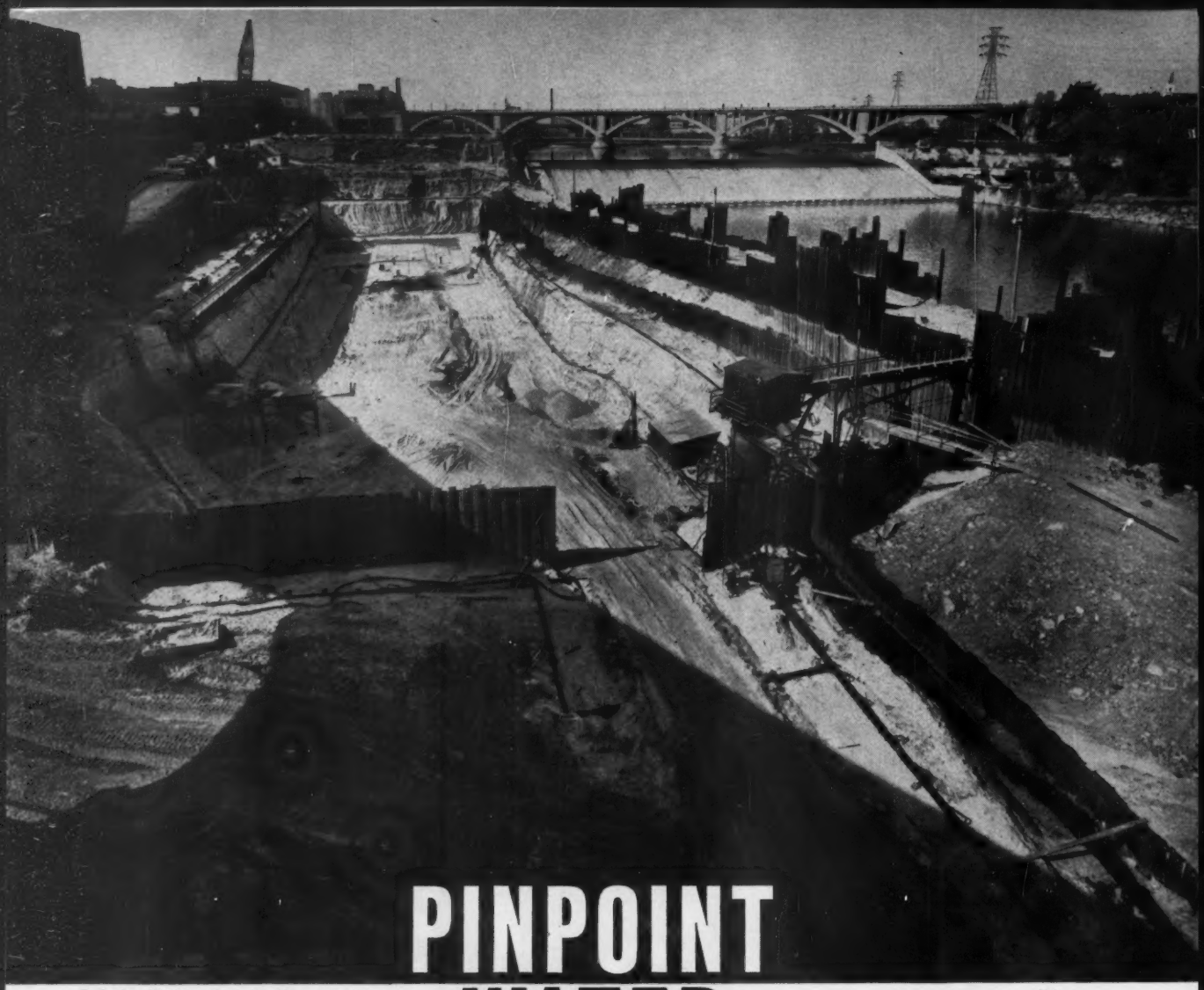
transmission, planetary axles, power steering and brakes, and a bucket with a maximum dumping angle of 60 deg for easier handling of sticky materials. — N. P. Nelson Iron Works ,Inc., 850 Bloomfield Ave., Clifton, N.J.

Circle 319 *on Reader Service Card*

New Engine Is Optional Equipment on Tractor Dozer

A 170-hp General Motors diesel engine is available as optional equipment for the Michigan model 180 tractor dozer. The unit has a two-stroke engine cycle, unit injection fuel system, and maximum parts interchangeability. The Cummins 162-hp still is available.—Construction Machinery Div., Clark Equipment Co., Pipestone Plant, Benton Harbor, Mich.

Circle 320 *on Reader Service Card*



PINPOINT WATER CONTROL

Contractor: Al Johnson Const. Co., Minneapolis, Minn.

61-3

There was a river next door to this excavation, the mighty Mississippi—but you'd never have known it by looking for ground water or seepage. Working in the difficult medium of soft, friable St. Peter's formation, a Stang engineered and designed dewatering system kept the entire working area of this exacting project water-free, the vertical slopes strong and firm. Involving wellpoints, sumping, and jetting operations, the efficient Stang dewatering system gave the contractor complete, flexible water control, in spite of the immediately adjacent river. Solutions to dewatering problems such as this are the specialty of Stang; through proper engineering analysis and design, Stang dewatering specialists continually save contractors time, money and trouble. Call Stang—there can be a qualified dewatering engineer on your jobsite tomorrow.

This project, the upper lock of the St. Anthony Falls Locks in Minneapolis, Minnesota, is only one of many interesting dewatering jobs described in the new 52-page Stang general catalog. Write for your free copy now.

JOHN W. **STANG** CORPORATION

8221 ATLANTIC AVENUE • BELL, CALIFORNIA • TACOMA • MINNEAPOLIS • OMAHA • TULSA • MOBILE • ST. PETERSBURG

ENGINEERS AND MANUFACTURERS OF DEWATERING EQUIPMENT, WELLPOINT AND PUMPING SYSTEMS • DEWATERING PLANNING • EQUIPMENT • SERVICE

Circle 160 *on Reader Service Card*

New Product Briefs

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

PUNCH PRESS is portable, weighs only 17 lb, and exerts up to 6,000 lb pressure for any shape hole up to ⅞ in. dia. Unit punches aluminum 3/16-in. thick and steel ⅛-in.—Modern Mfg. Co.
Circle 321 on Reader Service Card

TRAFFIC MARKERS for safety lanes are yellow tubes 1 to 6-ft long with 10-in.-sq bases. — Stokes Molded Products.
Circle 322 on Reader Service Card

BATTERY CHARGER for small electrically powered vehicles works automatically after it is connected to battery and 115-v ac source. Unit can be bolted to wall or floor by detachable bracket.—Exide Industrial Marketing Div., Electric Storage Battery Co.
Circle 323 on Reader Service Card

SUCTION PUMP is single-stage, handles non-corrosive liquids at temperatures up to 180 F at up to 48 gpm with heads to 100 ft. The cast-iron pump has enclosed impellers and screwed connections.—Allis-Chalmers Mfg. Co.
Circle 324 on Reader Service Card

FILTER MASK fits over nose and mouth, weighs less than one oz. The mask has an elastic headband and a flexible metal nose piece that adjusts to fingertip pressure.—Minnesota Mining and Mfg. Co.
Circle 325 on Reader Service Card

ELECTRODE for all position welding of steel can be used with either ac or dc, reverse polarity. Available in 14-in. lengths, E7018 iron powder, low hydrogen electrode is in 3/32, 1/8, 5/32, and 3/16-in.-dia. — Air Reduction Sales Co.
Circle 326 on Reader Service Card

SLOW DOWN device for gasoline engines used on air compressors operates during the unloading cycle. Unit is optional equipment on Champion gasoline-powered compressors. — Champion Pneumatic Machinery Co.
Circle 327 on Reader Service Card

continued on page 164

Now there's a
Mack M Model for

every practical off-highway job...

A year ago two new Mack M Models—a 45-ton six wheeler and 30-ton four wheeler—made their debut to receive an immediate acceptance unprecedented in off-highway operations. Now four additional M's are ready to take their place alongside the trailblazing two—a 15, 18, and 25-ton four wheeler and a 30-ton six wheeler. This pacesetting line of heavy-duty rear dumpers and tractors introduces a new dimension in profitable and practical off-highway hauling.

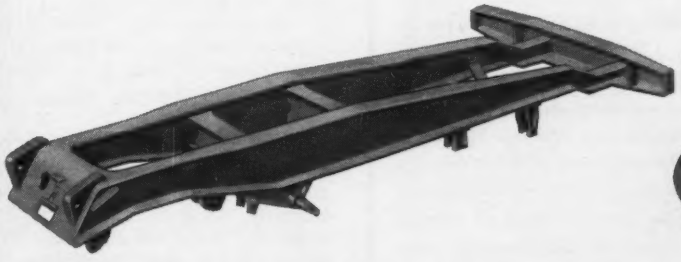
What's so special about the Mack M Models? To mention but a few features, there's a completely new cab design . . . there are improved new high strength, light-weight, longer-lasting single floor bodies—with or without heated floors . . . there are new Mack axles and bogies . . . there are newly engineered, extra sturdy frames . . . there are power options up to 525 hp to provide the getup and go that meets any challenge.

Most special of all, they're Macks . . . finest products of a line that has worked its way to the front in heavy-duty off-highway service. Add the extra features of the new M Models to Mack's already firmly established reputation for getting the job done at lower operating cost and with minimum downtime, and you come up with the answer to true off-highway efficiency.

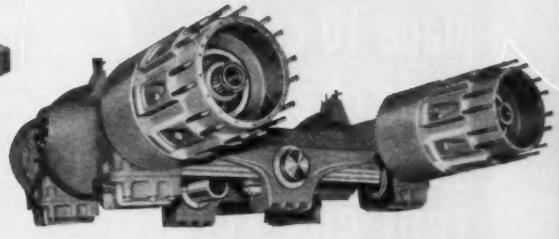
To select the right Mack for your own operations, contact your nearest branch or distributor. He's all set to show you what's so special about a Mack. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

8473

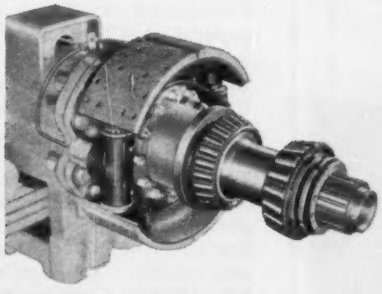
MACK
FIRST NAME FOR
TRUCKS



A NEW DIMENSION IN FRAME STRENGTH—Built to shrug off jarring shovel drops, the extra solid, extra strong five-crossmember frame of the M30X Mack is typical of the engineering advances in all M Models. Welded crossmembers, including integral front and rear bumpers, tie alloy steel fabricated I-beam main rails together.



A NEW DIMENSION IN BOGIE PERFORMANCE—Indicative of advances in all Mack M Models, this newly designed heavy-duty twin-axle bogie on six-wheeler M45SX offers the strength and simplicity of straight-through drive and single-reduction carriers with Mack Planidrive reduction at the hubs. Unusual bogie flexibility results in exceptionally long tire life, reduces frame twist and wracking and keeps all wheels equally loaded. Suspension is through walking beam and flat leaf springs.



A NEW DIMENSION IN BRAKING SURENESS—Safe, sure braking power for maximum control at all times is another feature of all M Model Macks. Illustrated here is the air hydraulic rear braking assembly for the M30X and M45SX. Front brakes are air; rear are air hydraulic with separate master cylinders for extra safety factor.

A NEW DIMENSION IN FRONT AXLE LOADING—The new tubular front axle, featuring steel tubing seven inches in diameter with walls ¾" thick, provides a reversed-elliot front axle for the M45SX and M30X that easily withstands the additional loading made possible by Mack's new forward cab location.

Circle 163 on Reader Service Card

NEW PRODUCT BRIEFS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

CHAIN WRENCH will handle pipe from ⅛ to 4-in.-dia, features ratchet-like action in either direction. Extra links may be added to the chain.—Ridge Tool Co.

Circle 328 on Reader Service Card

BACKFILL BLADE for Parsons Model 77 Trenchliner is 60 in. wide, 25 in. high, and has 12-in. ground clearance. It is attached with four pins, has a removable ½-in.-thick steel cutting edge connected to blade with seven bolts. —Parsons Co.

Circle 329 on Reader Service Card

ELECTRIC VIBRATOR for use on small bins, chutes, and hoppers features an external mechanical air gap adjustment that changes vibration intensity with the turn of a bolt. The MC-2 has a vibration frequency of up to 3,600 per min. The unit is 6x5x3 in. in size. —Cleveland Vibrator Co.

Circle 330 on Reader Service Card

TRACTOR CANOPY rests on rubber shock blocks at each vertical column. Tube-Lok canopy is free of metal-to-metal contact for quieter operation and longer life. —Portland Wire & Iron Works.

Circle 331 on Reader Service Card

BURNERS in the No. 99 line provide a 2,000-deg flame for a variety of jobs including weed burning, stump removal, and thawing. They are available with 4 or 5-gal fuel tank.—Aeroil Products Co.

Circle 332 on Reader Service Card

SPRAY GUN for dispensing reactive resins and hardeners mixes and dispenses resins when fed from a metering system to supply materials in proper proportions. Applications include spraying of urethane foam resins and insulation.—Leal Corp.

Circle 333 on Reader Service Card

TWO-WAY RADIO for car consists of transmitter-receiver unit under dash and amplifier unit in trunk. Model 6N100/SLT features 100-w vhf output. Amplifier alone can be added to equipment in 10 to 30-w range for 100-w output.—Aeronautical Electronics, Inc.

Circle 334 on Reader Service Card

SNOW PLOW fits on the Prime-Mover M-15B powered buggy, has 50-in. blade and is easily detached. The Prime-Mover bucket can be filled with sand or cinders. Lateral grooves on moldboard prevent snow from packing.—Prime-Mover Co., Muscatine, Iowa.

Circle 335 *on Reader Service Card*

GRADE INDICATOR can be mounted on grader or scraper to give slope or grade being cut. A 9-in. dial shows slope in percentage and ratio, as well as the crown slope in each of a slope on each half of a 24 or 32-ft roadway. The Grade-O-Meter comes with mounting bracket.—Fredcn Co.

Circle 336 *on Reader Service Card*

DRYING lubricant is sprayed from an aerosol can on engine plugs, lines, and inside distributor to remove moisture.—Product Research and Development Corp.

Circle 337 *on Reader Service Card*

CLEANER works with cold water to remove grease, gum, and oil from heavy equipment It is nontoxic, odorless, harmless to skin and clothing, and mixes one part to ten of salt or fresh water.—Davis Emergency Equipment Co.

Circle 338 *on Reader Service Card*

SET RETARDER is brushed or sprayed on concrete surfaces or forms to delay set to a depth of ⅛ in. for 24 hr. Surface concrete can then be hosed off to expose aggregates.—Edick Laboratories, Inc.

Circle 339 *on Reader Service Card*

SCRAPER blade is mounted beneath the bed of Warner & Swasey Gradall and hydraulically controlled from cab for shoulder work and snow removal.—Warner & Swasey Co.

Circle 340 *on Reader Service Card*

ROOF COATING for irregularly shaped roofs is made of neoprene, hypalon and chopped glass fiber roving. It is sprayed on in thicknesses of 1/16 to ⅛ in. A complete range of colors is available.—Elast-O-Glas Co., Great Neck, L. I., N.Y.

Circle 341 *on Reader Service Card*

DOLLY is adjustable to various diameters, attaches with one screw. Large model, to 23-in. dia., fits rimmed bottoms; 16-in.-dia model fits recessed bottoms. —Pemko Mfg. Co.

Circle 342 *on Reader Service Card*

New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy of the items you want, circle the appropriate number on the READER SERVICE CARD, just inside the back cover.

WHEEL EXCAVATOR — The Model 2000 wheel excavator, a 160-ton giant from Mechanical Excavators, Inc., for large scale stripping or excavating, is described and illustrated in a bulletin. — Baldwin-Lima-Hamilton Corp., Lima, Ohio.

Circle 343 *on Reader Service Card*

ROPE SLINGS — The Brown & Perkins line of wire rope slings, with dimensions and capacities, is described in Bulletin 401. — Brown & Perkins, Inc., Perth Amboy, N. J.

Circle 344 *on Reader Service Card*

BITUMALS — Bitumals for stabilization and maintenance of base-course material prior to surfacing is the subject of Bulletin A-28. — American Bitumals & Asphalt Co., San Francisco, Calif.

Circle 345 *on Reader Service Card*

TREE PLOWS — Tree plows in two sizes for Eimco's crawler tractors are described in Bulletin L-1182.—Eimco Corp., Salt Lake City, Utah.

Circle 346 *on Reader Service Card*

STEEL FORMS—A 20-p. catalog describes and illustrates various construction projects on which steel forms were used. — Economy Forms Corp., Des Moines, Iowa.

Circle 347 *on Reader Service Card*

LP GAS—The National LP-Gas Council has issued a 20-p. booklet on uses of liquified petroleum gas for portable, mobile, and stationary fuel-consuming equipment.—National LP-Gas Council, Evanston, Ill.

Circle 348 *on Reader Service Card*

TRUCK CRANE — Harnischfeger's 25-ton P&H truck crane that works as a crane, dragline, or clamshell is described and illustrated in a 12-p. technical portfolio. — Harnishchfeger Corp., Milwaukee, Wis.

Circle 349 *on Reader Service Card*

continued on page 169

Bethlehem Wire Rope serves world's most powerful radio station

On a remote Maine peninsula a huge antenna web forms the heart of the world's most powerful radio station. It is hung from 26 steel towers which range in height from 700 to 1000 ft. Bethlehem furnished 124,000 ft of $2\frac{3}{4}$-in. diameter prestretched, bethanized (electrolytically zinc-coated) wire rope for a balancing system of 36 counterweights, each weighing 200 tons. The rope raises, lowers, and holds the antenna taut despite fluctuations in temperature, ice loads, and high winds.

A key communications center for the U. S. Navy, this very low frequency transmitter can make instantaneous contact with both surface and undersea craft thousands of miles away.

Bethlehem Wire Rope has great strength and durability. And when the individual wires are bethanized—coated electrolytically with a uniform, tightly bonded jacket of 99.9% pure zinc—the rope offers effective protection from atmospheric corrosion. Its excellent fatigue-resisting properties are important on installations of this type, where vibration is a constant problem.

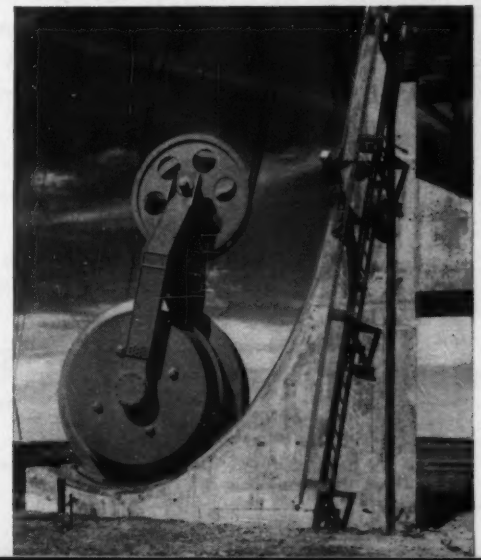
If you would like full information about Bethlehem Wire Rope, simply get in touch with the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

There's a distributor of Bethlehem Rope near you, supplied by our nationwide network of wire rope mill depots.

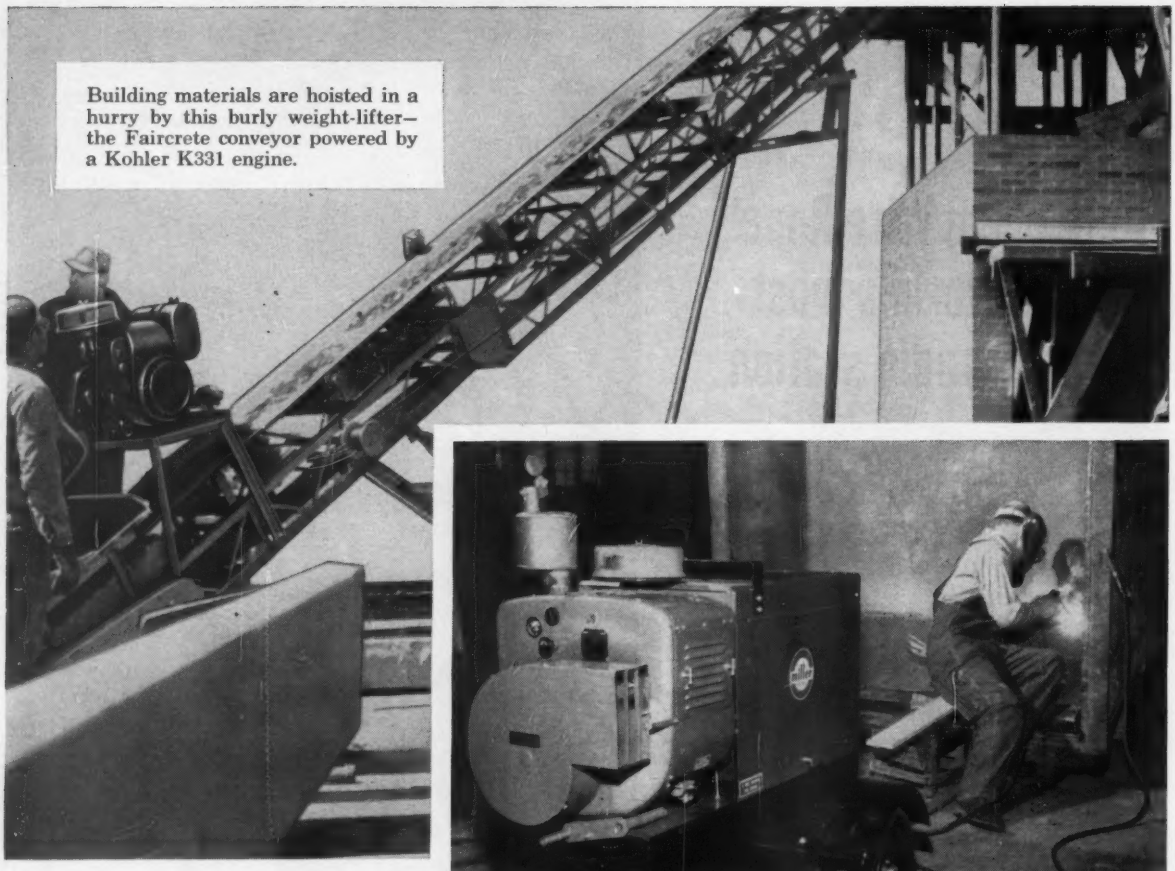
Antenna system erected by Nat Harrison Associates, Inc., Miami, Florida.



Steel

for strength
. . . economy
. . . versatility

This counterweight, one of 36 supplied by Bethlehem, weighs a whopping 400,000 pounds. Bethlehem Rope has the muscle to handle loads like this with ease.

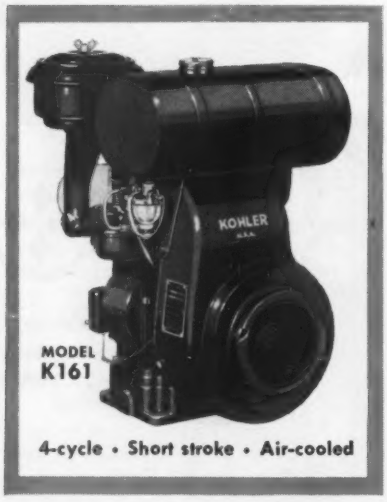


Building materials are hoisted in a hurry by this burly weight-lifter—the Faircrete conveyor powered by a Kohler K331 engine.

Paper-thin metal or heavy armor plate for purposes ashore, afloat or aerial, are welded by Miller welders. Kohler K662 engines provide the power.

KOHLER ENGINES

TOUGH JOB TAMERS



4-cycle • Short stroke • Air-cooled

The rugged staying power of Kohler engines makes smooth going out of rough conditions . . . sets non-stop running records . . . puts cost-saving efficiency into construction equipment.

Reliability is assured by quality control throughout production . . . Kohler cast iron construction gives extra strength . . . Starting stays dependably quick in all weather . . . Large bore and short stroke design steps up power, decreases friction, prolongs engine life . . . Balanced crankshaft reduces vibration.

Kohler engines have been manufactured for 40 years . . . Sold and serviced nation-wide by authorized distributors and dealers.

From 4 to 24 H.P. Write for illustrated booklet.

KOHLER CO. *Established 1873* KOHLER, WIS.

KOHLER OF KOHLER

ENAMELED IRON AND VITREOUS CHINA PLUMBING FIXTURES • ALL-BRASS FITTINGS • ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION CONTROLS

Circle 168 on Reader Service Card

NEW PUBLICATIONS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

CYLINDER CASTING — Recommended procedure for cylinder casting, including selection of molds, correct sample taking, and filling, handling, and curing of cylindrical samples is provided by Bulletin RM-48.—Builders Co., Cleveland, Ohio.

Circle 350 on Reader Service Card

STEEL STRAPPING — Steel strapping to secure diaper forms for faster mortaring of sewer and pressure pipe joints is the subject of Report S7-13.—Acme Steel Co., Chicago, Ill.

Circle 351 on Reader Service Card

BRIDGE DESIGNS — A booklet entitled "36 Ideas for Tomorrow's Short-Span Bridges" contains designs selected from entries in a steel highway bridge competition. —American Bridge Div., Pittsburg, Pa.

Circle 352 on Reader Service Card

LUBRICANTS—A brochure suggests the proper lubricant for various machinery, from lightest fluid types to heaviest greases.—Lubriplate Div., Fiske Bros. Refining Co., Newark, N. J.

Circle 353 on Reader Service Card

AGGREGATE PLANTS — Bulletin CC-1-61 outlines Universal's line of portable aggregates production equipment.—Universal Engineering Corp., Cedar Rapids, Iowa.

Circle 354 on Reader Service Card

CONDUIT — Sealtite flexible, water-tight conduit, in four basic types, is the subject of Bulletin S-544. — Anaconda Metal Hose Div., Waterbury, Conn.

Circle 400 on Reader Service Card

SLINGS — Nylon and Dacron slings for handling parts that must not be marred or scratched are the subject of Bulletin 661. —Caldwell Co., Rockford, Ill.

Circle 355 on Reader Service Card

OIL FILTERS—Oil filters in three sizes up to 300 gpm flow rating that have two-stage filtration are the subject of Bulletin I & M-5111. — Vickers Inc., Detroit, Mich.

Circle 356 on Reader Service Card

continued on page 170

NEW PUBLICATIONS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

PUMP MOTORS—Two groups of pump motors, Jet pump from ¼ to 2 hp and close-coupled to 10 hp, are described in Bulletin L-4121A. — Kingston-Conley, Inc., Plainfield, N. J.

Circle 357 *on Reader Service Card*

RIPPERS—New tips, teeth, and shanks for Caterpillar rippers, as well as dozer, scraper, and loader cutting edge improvements are detailed in Form DE117.—Caterpillar Tractor Co., Peoria, Ill.

Circle 358 *on Reader Service Card*

WELDING—"Handbook for Welding" tells how to weld low alloy high tensile steels with Atom-Arc iron powder low hydrogen electrodes. — Alloy Rods Co., York, Pa.

Circle 359 *on Reader Service Card*

CONCRETE HANDLING — Gar-Bro's line of concrete handling equipment is listed and methods of use described in a 36-p. booklet. — Gar-Bro Mfg. Co., Los Angeles, Calif.

Circle 360 *on Reader Service Card*

OIL DISTRIBUTOR—Model RHU road oil distributor, in 800 and 1,000 gal capacities with three styles of spray bars, is the subject of a bulletin. — Rosco Mfg. Co., Minneapolis, Minn.

Circle 361 *on Reader Service Card*

WIRE ROPE — "Wire Rope for Structural Uses" is a 32-p. booklet illustrating wire rope uses in bridges, suspended roofs and other projects. — Bethlehem Steel Co., Bethlehem, Pa.

Circle 362 *on Reader Service Card*

MOBILE PLANTS — Telesmith closed circuit crushing and screening plants, featuring high portability, are described in Bulletin 276. — Smith Engineering Works, Milwaukee, Wis.

Circle 363 *on Reader Service Card*

SCREEN TENSIONERS—Wedg-tite tensioners for cloth and plate deck Allis-Chalmers screens can be adjusted while the screen is running. Bulletin 26B9995 describes them. — Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Circle 364 *on Reader Service Card*

American Pipe & Construction Company operates Autocars over the vast stretches of the West and Far West. One primary reason for recently ordered A-10264's is the outstanding WHITE-AUTOCAR service organization.

Tough construction hauling built Autocar's name

And WHITE-AUTOCAR comprehensive service backs up Autocar's fame as the "World's Finest". It's a combination that makes Autocar pay off most profitably in the rugged work of construction and building-material hauling.

For example, American Pipe & Construction Company uses Autocar A-10264's to cover vast distances across the California desert, up into Washington, Oregon, Idaho and western Canada, with other runs over Arizona and New Mexico. This is no country for "tenderfoot" trucks!

These Autocars were custom-engineered for American to provide maximum performance and a reduction of 2500 lbs. in chassis weight over so-called "equivalent" standard models.

Combine greater payload with WHITE-AUTOCAR specialized heavy-duty truck servicing, and you see why construction men hate to settle for less than Autocar.

Circle 171 *on Reader Service Card*

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pa.

SEARCHLIGHT SECTION

(Classified Advertising)

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The advertising rate is $21.75 per inch for Equipment & Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

Employment Opportunities—$37.00 per inch, subject to Agency commission.

An advertising inch is measured ⅞" vertically on one column. 3 columns—80 inches—to a page.

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Positions Wanted undisplayed advertising rate is one-half of above rate payable in advance.

Box Numbers—count as one line.

Send New Advertisements and Inquiries to Classified Adv. Div. CONSTRUCTION METHODS & EQUIPMENT, P. O. Box 12, N. Y. 8, N. Y.

POSITION WANTED

Construction Equipment Field Man 35 years of age, with 15 years experience in heavy equipment business in sales, supervision, parts, service, field work and equipment superintendent. Box 219, Mt. Prospect, Illinois.

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946 AND JUNE 11, 1960 (74 STAT. 208) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

CONSTRUCTION METHODS AND EQUIPMENT published Monthly at New York, New York for October 1, 1961.

1. The names and addresses of the publisher, editor and managing editor are: Published by McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N. Y.; Editor, Henry T. Perez, 330 West 42nd St., New York 36, N. Y.; Managing editor, Frank W. Corrigan, 330 West 42nd St., New York 36, N. Y.; Business manager: None.

2. The owner is McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N. Y. Stockholders holding 1% or more of stock are: Donald C. McGraw, Elizabeth McGraw Webster, Donald C. McGraw, Jr. & Harold W. McGraw, Jr., Trustees under Indenture of Trust m/b James H. McGraw, dated 1/14/21 as modified; Donald C. McGraw & Harold W. McGraw, Trustees under an Indenture of Trust m/b James H. McGraw, dated 7/1/37 as amended; Donald C. McGraw, individually; Estate of Mildred W. McGraw, Donald C. McGraw and Catharine McGraw Rock, Executors; (all of 330 West 42nd Street, New York 36, N. Y.); Grace W. Mehren, 536 Arenas St., LaJolla, California; Douglass & Co., 140 Broadway, New York, N.Y., Touchstone & Co., c/o Wellington Fund, Inc., Claymont, Delaware.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 49,840.

McGRAW-HILL PUBLISHING COMPANY, INC.
By JOHN J. COOKE, Vice President & Secretary

Sworn to and subscribed before me this 18th day of September, 1961.

[SEAL] JANET A. HARTWICK

(My commission expires March 30, 1963)

Advertisers' Literature

Listed below is free material offered in this issue's advertisements received up to Oct. 15. To get the items you want, circle appropriate numbers on the SERVICE CARD inside the back cover.

TWO-WAY RADIO—The E line of two-way radios for 450 mc band is described.—RCA.

Circle 365 on Reader Service Card

HOSE—Guide for Routing and Installation of Flexible Hose Assemblies is the title of a new booklet.—Aeroquip Corp.

Circle 366 on Reader Service Card

BACKHOE—The model 5000 backhoe, with ½-yd bucket capacity and 15½-ft digging depth, is described.—Cabot Corp.

Circle 367 on Reader Service Card

GUNNING—Catalog GA30 describes a unit that shoots concrete containing up to ¾-in. aggregate.—True Gun-All.

Circle 368 on Reader Service Card

TRAILERS—Platform, low bed, and dump trailers are described in separate folders.—Trailmobile.

Circle 369 on Reader Service Card

FILTER—Two-stage filtration in hydraulic circuits to trap particles over 10 microns is covered in a bulletin.—Vickers, Inc.

Circle 370 on Reader Service Card

SHORING—Shoring with adjustable posts that expand from 7½ to 13 ft is the subject of Bulletin 199A—Safway Steel Products, Inc.

Circle 371 on Reader Service Card

PUMP—A hydraulic pump for operating single and double-acting cylinders is the subject of literature.—Owatonna Tool Co.

Circle 372 on Reader Service Card

RADIO—A two-way, hand-held radio for office-to-field or on-the-job applications is described in a brochure.—E. F. Johnson Co.

Circle 373 on Reader Service Card

LUBRICATION—A description of how Oil-Mist lubrication helped a mining firm is in a brochure.—Alemite Div., Stewart-Warner Corp.

Circle 374 on Reader Service Card

They PAY for the* Editorial Quality of Construction Methods

The editorial quality of a publication is measured quite easily by the simple yardstick of whether or not it is read by the audience for which it is edited. A continuous increase in paid subscriptions for CONSTRUCTION METHODS magazine (50,015) attests to the value key men in construction place on it.

Here's what some of the industry's top men have to say about CONSTRUCTION METHODS – the only national construction monthly they pay to receive.

H. D. Case, President
Case Construction Corp., Mount Airy, Md.
CONSTRUCTION METHODS subscriber since 1937
—$4 million of construction a year
—Owns $500,000 of equipment
—6 key men subscribe to CONSTRUCTION METHODS

He says: "CONSTRUCTION METHODS has given me many a good idea, and helped solve many problems. I find it helpful in selecting equipment. I read the ads which are informative and helpful."

Nello L. Teer, Sr., Chairman of the Board
CONSTRUCTION METHODS subscriber since 1919
Nello L. Teer Company, Durham, North Carolina
—Over $25 million of construction a year
—Over 2,500 units of equipment worth $15 million
—21 key men subscribe to CONSTRUCTION METHODS

He says: "I have learned many techniques many times from CONSTRUCTION METHODS. We read the ads carefully for different items. We have written to advertisers asking for information on equipment advertised."

Americo Cardi, Partner
Campanella and Cardi Construction Co.
Hillsgrove, Rhode Island. Subscriber since 1944
—$18 million of construction
—Over 850 units of equipment worth $6½ million
—50 key men subscribe to CONSTRUCTION METHODS

He says: "Equipment and new methods covered by this magazine are very helpful. I like job stories which keep me up to date. I also read the ads to keep up with newest machinery and what they can do."

W. T. Gilbert, President
C. W. Blakeslee & Sons, New Haven, Conn.
CONSTRUCTION METHODS subscriber since 1930
—$11 million of construction a year
—475 units of equipment valued at $3.8 million
—33 key men subscribe to CONSTRUCTION METHODS

He says: "This outstanding magazine fills the gap between the technical material in engineering publications and advertisements on different equipment and materials. It combines the two by showing practical use of equipment and techniques on the job."

George D. Frazier, President
Frazier-Davis Construction Co., St. Louis, Mo.
CONSTRUCTION METHODS subscriber since 1939
—$25 million construction a year
—300 units of equipment worth $1.5 million
—27 key men subscribe to CONSTRUCTION METHODS

He says: "This is an excellent magazine. Fine editorial coverage of how equipment is used on different projects are of special interest to me. Looking over the ads is also an important part of my reading."

Lincoln A. Sollitt, President
Sollitt Construction Company, Inc., South Bend, Indiana
CONSTRUCTION METHODS subscriber since 1926
—$9 million of construction a year
—Over 530 units of equipment valued at $1.5 million
—54 key men subscribe to CONSTRUCTION METHODS

He says: "CONSTRUCTION METHODS belongs on the "must reading" list because of its excellent coverage of equipment news in advertisements and stories, and because of its valuable, practical "how to do it" articles."

C. F. Replogle, President
C. F. Replogle Company, Circleville, Ohio
CONSTRUCTION METHODS subscriber since 1939
—$17 million of construction a year
—1,300 units of equipment worth $6 million
—85 key men subscribe to CONSTRUCTION METHODS

He says: "I look to CONSTRUCTION METHODS for items on new equipment and its use, new ideas and techniques used to whip problems. I always look at the ads for new products or applications that we can use."

J. Warren Shoemaker, President
Warren Brothers Roads Company, Cambridge, Mass.
CONSTRUCTION METHODS subscriber since 1934
—$16 million plus construction a year
—11,000 units of equipment valued at $5.8 million
—26 key men subscribe to CONSTRUCTION METHODS

He says: "CONSTRUCTION METHODS gives me many good ideas on equipment and techniques. Editorial items and advertisements are filed and I refer to them when looking for specific methods or equipment to do a job. I find ads as useful as the editorial."

***50,015 Paid Subscribers audited by the AUDIT BUREAU OF CIRCULATIONS since 1928**

AUDITED PAID CIRCULATION ABC

Construction Methods AND EQUIPMENT ABC ABP

A McGRAW-HILL PUBLICATION

Is Your Shop Short on Air?

When you design a centralized air system for your shop, make sure the compressor is big enough to meet all your needs. Follow this guide to pick the right size.

AN AIR TOOL without compressed air is no tool at all. Make sure your air tools operated effectively by providing an adequate supply of air.

Centralized air systems offer the best insurance against air shortages in the shop. A centralized system consists of one or more compressors, a distribution system, and outlets equipped with fittings for easy connection of air tools.

The most important factor in designing a centralized air system is selection of the proper size compressor. Contractors need a compressor big enough to operate several air tools at the same time. To pick a compressor large enough to meet all your air needs, first list your major air tools and estimate their air requirements. Most tool makers provide this data.

Next step is to apply a load factor. Few air tools operate continuously. As a result, their air consumption is considerably less than the average value stated by the manufacturer. Ratio of actual air consumption to that for full-load, continual operation is called load factor.

Two items are involved in load factor. First is the time factor, or percent of total time the tool actually uses air. Second is the work factor, or percent of maximum work output actually done by the tool. Thus, load factor is the product of time and work factors.

How to Figure Load Factor

To establish load factor for each air tool, you can use past experience as a guide, plus data from the tool manufacturers. But be sure the load factors you choose represent usual procedure in your shop. To obtain probable total air demand of your shop tools, multiply the air requirement of each tool by the load factor and add the results.

This sum is a rough indication of compressor capacity needed for your shop. Some contractors add an arbitrary 10% for piping and tool leakage. And remember that your compressed air needs probably will increase in the future. Pick a compressor that will meet your shop air needs for several years.

If your shop air requirements are high, you have a choice between one large compressor and two or more smaller ones. Two compressors require more investment than one, but they offer several advantages. A two-compressor installation insures a continuous air supply even if one compressor breaks down. Many contractors with a separate paint shop find that it pays to install a separate compressor for paint spraying equipment. Lack of compressed air here will seriously disrupt work and clog tools.

In most shops, compressed air is distributed from the compressor through steel pipes and flexible hoses. These should be protected to avoid damage. Good piping design limits pressure drop between compressor and tool. Here are a few pointers on piping design:

Make intake pipe at least as large as compressor intake opening. For every 10 ft of run from compressor, make pipe diameter 1 in. greater. Make discharge line at least as large as compressor outlet opening. Use as few bends as possible. Be sure run is short and direct. Fit moisture traps at low points of piping to keep air as dry as possible, especially where lines are long.

Provide outlets on each header or main for connection of hoses. Fit outlets to top of pipe so moisture won't drain into tools. It is a good plan to install receivers near points of heavy usage to insure adequate air supply. Make them of liberal size to reduce peak loads on compressor.

Provide Plenty of Outlets

Outlets should be spotted as close to work areas as possible. Install plenty of outlets and equip them with quick-coupling fittings. Give some thought to extending the air system beyond the shop into the yard. Strategically placed outlets in the yard come in handy for painting and lubricating outdoors in good weather.

Here are a few examples of air supply gimmicks that CM&E staffers have run across recently:

- Fort Wayne contractor Ruckman & Hansen makes the hollow columns of their shop building double as air receivers. Columns throughout the shop are steel piles fitted with connections, valves and moisture traps near the floor. A 200-cfm compressor built by the Wayne Pump Co. supplies air. Retracting hose reels at each column help deliver air anywhere in the shop.
- To provide air in the field without a compressor, a Michigan contractor fitted a shop truck with a front bumper that carries air to inflate tires and operate small air tools. They made the bumper from a section of 4-in. steel pipe by capping each end and mounting it on the front of the truck frame. A female quick-connector feeds an air hose at the outlet.
- A Canadian contractor installs a tee fitting in the air system of their LeTourneau-Westinghouse scrapers to supply air for tire inflation. They install the fitting at the air tank and provide about 20 ft of hose equipped with nozzle and tire valve.

"My New 43-M Hoe Will Let Me Underbid My Competitors By 10%"

JOB FACTS: *Job Location — Far Rockaway Beach, New York. Project — $140,000 subcontract to dig trenching for $22,500,000.00 community center development. Average Trench Dimensions — 5' deep x 5' wide. Total No. of Linear Feet — 57,000. Conditions — Sandy soil with watertable encountered 2' below surface. Reinforced 3' square concrete beams laid over 6" steel pilings driven to 100 feet because of soil and moisture.*

"And, that's only part of the story," continued Frank Marino, president of the Frank L. Marino Corporation, Brooklyn, New York.

"I'm already saving five man-hours per week on maintenance, and it will outdig any of our other rigs by at least 40 feet of trench an hour. I estimate the Marion, due to increased production over other equipment on the job, will have paid for itself in less than two years. As a matter of fact, I'm considering trading in another backhoe on this job and purchasing another Marion."

Mr. Marino's brother, Jerry, operates the Marion. He comments: "The 43-M has plenty of economical power. I've been working heavy equipment for 29 years and the Marion 43-M is one of the easiest to handle, most powerful and economical machines I have ever operated."

you get more with MARION

MARION POWER SHOVEL COMPANY • Marion, Ohio

A Division of Universal Marion Corporation

Circle 175 on Reader Service Card

Advertisers in this month's

Construction Methods AND EQUIPMENT

330 WEST 42nd STREET, NEW YORK 36

McGRAW-HILL

LOngacre 4-3000

Number of copies of this issue printed 53,303

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LOcust 8-4330
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Methods Memo...

Instant Concrete

Standing beside his highly mobile concreting truck is Harold Jackson, owner of Jackson Masonry Service in Los Angeles. Jackson specializes in pumping concrete in small amounts to especially hard-to-reach sites. His truck is dispatched to general contractors who need the service in a hurry.

The concreting unit consists of a pump and a hopper mounted in the rear of a Jeep truck. The unit operates from the Jeep's power take-off; its hopper has only ⅛-yd capacity but is fed continuously by a transit mix truck. The Jeep is driven as near the pour site as the mix truck can go. Then a 2 or 2½-in. hose runs from the pump to the pour.

Jackson's unit places about 12 yd an hr in areas ranging from Victorian-style building parapets to swimming pools and fallout shelters. Most concrete ever poured in one day is 50 yd in 4 hr; highest pour ever reached is eight stories.

Navy to Auction Construction Equipment

U.S. Navy's bargain basement will open on Nov. 16 when more than $4 million of surplus equipment, including construction machinery, will be auctioned at the Golden Triangle Hotel in Norfolk, Va. Used scrapers, bulldozers, rock crushers, concrete mixers, rollers, air compressors, and trucks will be among hundreds of items sold.

The Navy's Consolidated Surplus Sales Office says many of the items are in very good condition and can be bought for much less than their original cost. Registration for the auction will begin Nov. 15 at 10 a.m. All items will be on display for 21 days prior to the sale at military reservations in southern Virginia, North Carolina, and West Virginia.

Color slides of items to be sold will be shown at the auction. Buyers must furnish a deposit of 20% of their bid price in cash, certified check, cashier's check, or money order.

B.R.I. Becomes Technical Society

Starting next year the Building Research Institute will become an independent non-profit technical society of building science. It is currently a unit of the Div. of Engineering and Industrial Research of the National Academy of Sciences-National Research Council.

The idea to give the BRI its independence is not new. The group was established in 1951 with the idea that it would work toward independent status. No organizational changes will occur. However, the group is expected to broaden its interests in building research and administration of co-operatively sponsored research projects.

BRI President Leon Chatelain, Jr., reported the society will continue its semi-annual research conferences. He said the BRI also will maintain an unbiased approach to the distribution of information about building.

Traveling Classroom Takes a Tour

A mobile welding lab and classroom housed in an 8x35-ft trailer is touring the country to bring industry the latest techniques in hardsurface welding. Alloy Rods Co. of York, Pa. is sponsoring the tour.

Sealed off at one end of the trailer, the welding lab is completely equipped for demonstrations of various types of hardsurfacing, including semi-automatic and automatic buildup. Observers in the classroom are protected by a special filter glass window. The classroom is equipped with 12 desks and chairs, a built-in projector for slides and film, a viewing screen, a blackboard, and a complete display of arc welding electrodes and wear resistant alloys.

Thermic Boring Saves Rebuilding

Thermic boring recently punched a 9-in. hole through a 7-ft concrete wall in England when a drainage line had to be re-routed. In thermic boring, the tip of a gas lance packed with steel rods is heated until red hot. Heating is stopped and then oxygen is blown through the tube. The rods oxidizing at the end of the lance produce a flame hot enough to melt concrete.

The "drilling" took place at the Ffestiniog Power Station's turbine house. The building extends 100 ft below ground and re-routing the drainage system would have meant a long and costly rebuilding job. Burning the hole took 26 min.

The boring required 720 cu ft of oxygen and six 22-ft-long, ½-in.-dia lances. The technique was developed by the British Oxygen Co. Ltd.

Fold out the Reader Service Card and use it while you read the issue

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PAVING . . . HOW TO GET THE BEST RESULTS . . . 50¢

R1 A 51-page booklet containing outstanding articles on the subject of paving. Covers bituminous surface treatments, mixed-in-place bituminous surfaces, bituminous penetration macadam, plant-mix bituminous pavements, preparation for concrete paving, batching and mixing concrete, placing and finishing concrete, jointing and curing of concrete paving, mixed-in-place pavements.

CONCRETE MIXING AND PLACING . . . 50¢

R2 An 88-page booklet containing a series of articles on the fundamental principles of concreting for all types of structures. Subjects include: concreting equipment selection, application, and maintenance; production factors; form planning, design, and construction; design and control of concrete mixes; handling and placing concrete; underwater concreting.

PRESTRESSED CONCRETE . . . 50¢

R5 A 20-page special report dealing with a variety of prestressing applications; commercial prestress — new market for contractors; pre-tensioning bed — assembly line for prestress products.

EQUIPMENT MAINTENANCE GUIDE . . . 50¢

R6 A 36-page booklet in which 15 service experts detail the proper maintenance of crawler tractors, graders, scrapers, rollers, compressors, trenchers, crushers, trucks, cranes, asphalt plants, loaders, air tools, pavers, rock drills, wheel tractors.

DOES YOUR INSURANCE PROGRAM *REALLY* PROTECT YOU? . . . 25¢

R8 A 12-page booklet by a construction insurance expert explains the importance of a sound program . . . how to strengthen liability coverage . . . how to protect your job and your property. Included is a check list of insurance for contractors.

SURETY BONDS . . . Their Function, Value and Effect . . . 25¢

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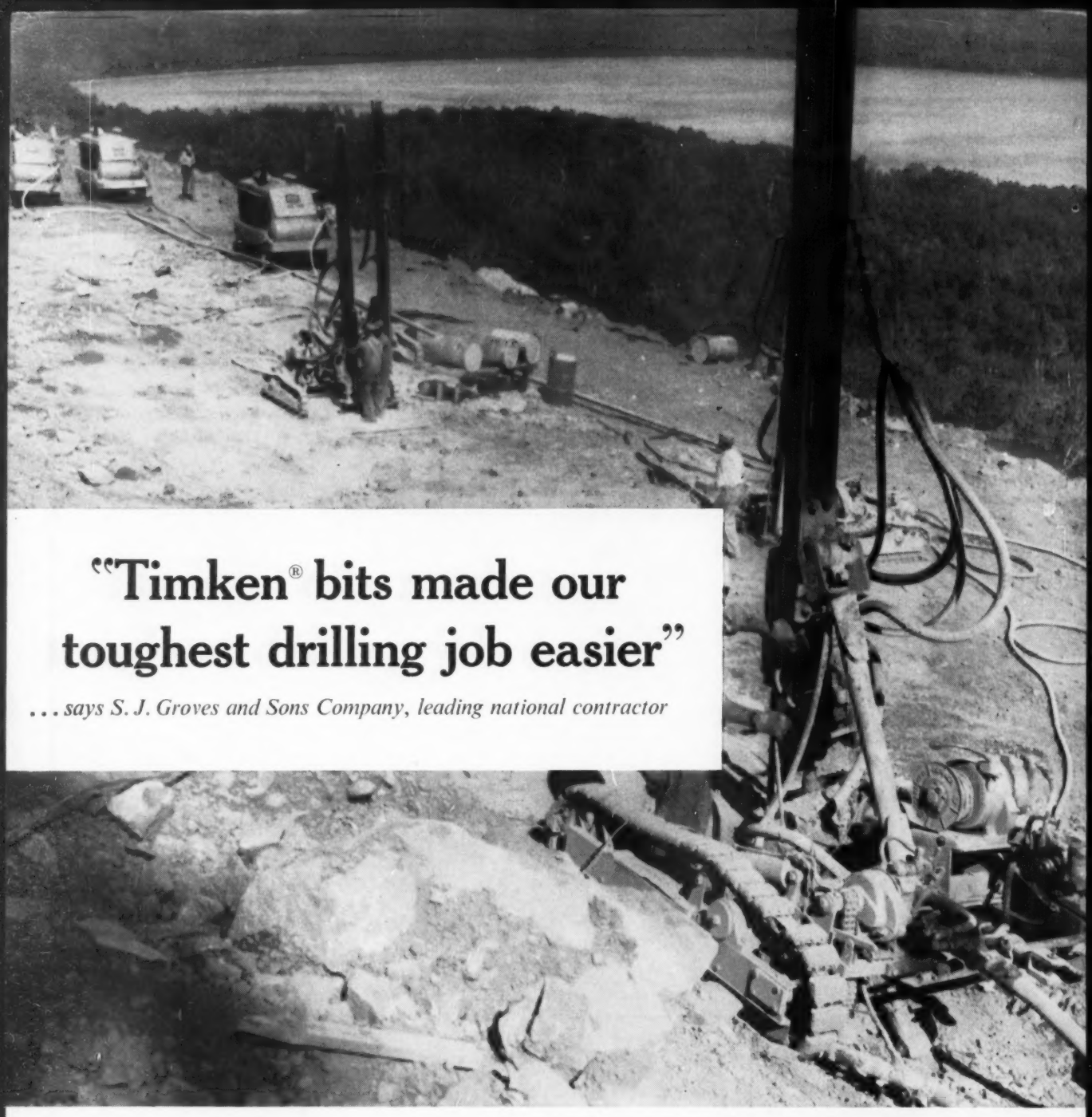

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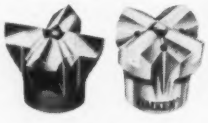

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